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THE METAL INDUSTRY

WITH WHICH ARE INCORPORATED
THE ALUMINUM WORLD: COPPER AND BRASS: THE BRASS FOUNDER AND FINISHER
ELECTRO-PLATERS REVIEW

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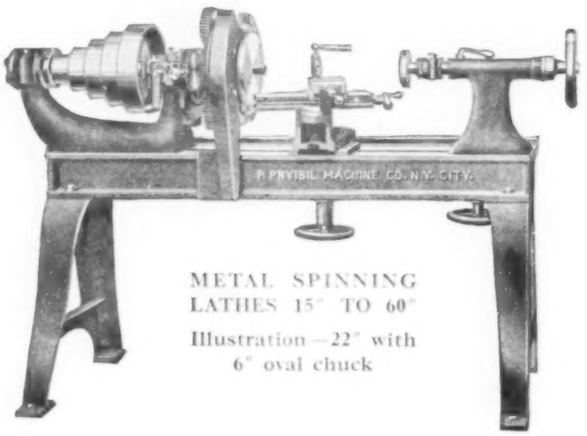

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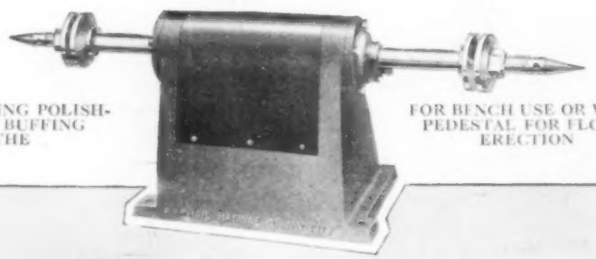

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THE METAL INDUSTRY
WITH WHICH ARE INCORPORATED
THE ALUMINUM WORLD: COPPER AND BRASS: THE BRASS FOUNDER AND FINISHER:
ELECTRO-PLATERS REVIEW.

Vol. 20 New York, July, 1922 No. 7

American Electro-Platers Society

Tenth Annual Convention Held in Cincinnati, O., June 28-30, 1922

Written for The Metal Industry by EDWIN E. MYERS, Cincinnati, Ohio

One of the best features of the 10th annual convention of the American Electro-Platers Society, which held its meeting at the Hotel Gibson here June 28, 29 and 30, was an emphatic feeling of confidence in the future of the business. The correspondent of METAL INDUSTRY found this feeling so strong among the exhibitors, while mingling with them to get short notes descriptive of their exhibits, that he was impressed by the optimism. So your correspondent pursued the inquiry among members on the floor of the convention, and, without exception, the replies to his question "How do you find business and what of the future?" were strong in confidence in the future. Really the worst report he heard was from a concern that is now doing about 85 per cent of normal, but this concern is making preparations for 100 per cent operation in the near future. "The business outlook justifies this," is the way the representative of this company explained it to the writer.

WALTER J. ALLEN
President

B. D. AUFDERHEIDE
First Vice-President

JOHN E. GARRICK
Second Vice-President

The really impressive part of these statements of confidence in the future of business was not so much the statement itself, as it was the earnestness in which it is told. There was entire absence of exaggeration, and the various concerns interviewed are not only talking good business now and in the future, but they are practicing it in operation and sales.

After attending this meeting there is no reason for any one in the trade, or its allied branches, to feel any way but that business is rapidly drifting towards normal—and normal means balances on the right side of the ledger that find their way in the faces of the trade in broad, happy smiles.

Aside from the usual list of technical papers, rich in constructive research, there followed practically every paper discussions on the various features and theories advanced. You can get an idea of earnestness of these men when you realize that it was hot in the convention hall, yet they came to each session—and there were three a day—and plunged from one technical subject into another with all the relish and joy with which the ragamuffin gobbles an ice cream cone at a picnic. They shed their coats, some their collars, and many sweltered through with old-fashioned suspenders displayed with unconcern over fine silk shirts. You can never tell how a fellow holds up his pants, even if he does wear a silk shirt, until he takes off his coat, and, lo a belt for ornament and good, old-fashioned "galluses" to do the work.

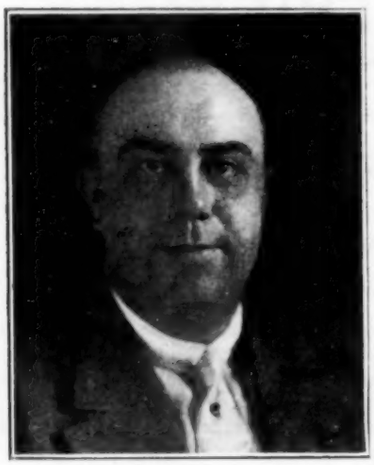
The business session of the convention, which was held on the morning of the last day, was a spirited one. The election of officers was without contest, but there were two candidates nominated for editor of the *Review*. The honor went to Frank C. Mesle, of Syracuse, N. Y., who received 41 votes, against 21½ for Joseph Hess, Jr., of New York.

Walter J. Allen, of Grand Rapids, Mich., was elected

president; Ben Aufterheide, of Indianapolis, first vice-president; John E. Garrick, Attleboro, Mass., second vice-president; Frank J Hanlon, Chicago, secretary-treasurer.

Providence, R. I., gets the next convention. Lewis Schulte, of Newark, N. J., practically cinched the 1924 convention for his city when he said the session "would be held on a steamer three miles from shore." "Atta boy! We'll be there with bells on," was the electrical response.

A number of changes were made in the constitution.



FRANK J. HANLON
Secretary-Treasurer

FRANK C. MESLE
Editor of the Monthly Review

The principal change was to increase the salary of the secretary-treasurer from $60 to $100 a year. The provision in the old constitution which restricts representation as delegates to the convention to active members was retained, as against a proposition to open up this privilege to associate members. The retiring president is also made ex-officio officer of the Supreme Society. This has been done by practice in the past, and it is now made a part of the primary law of the Society. A proposition to change the convention date to 10 days prior to September 1, of each year, also was voted down. Several changes were made throughout the constitution in wording, and provision is made for bonding the secretary-treasurer.

A resolution of thanks was passed by unanimous vote as appreciation of the splendid co-operation and assistance that the Bureau of Standards is giving the Society in studying and developing improved practices and processes.

"Electroplating, as Met by the Analytic Chemist" was discussed by F. C. BROEMAN. He discussed efficiency in solutions, and showed deposits from a few minutes up to 48 hours. He dwelt at length on the detrimental influences of impurities in the nickel solution. In experiments he finds that impurities in nickel anodes (copper, zinc and iron), as well as nickel salts, to a more or less extent had a varying influence upon the deposit. Copper is the most detrimental of all—even minute amounts making dark stain on the deposit. On the other hand, zinc, in minute quantity, produces a brighter deposit. It is general belief among platers that a small quantity of zinc produces a dark stain. This is now found to be due to minute traces of copper. Excess amount of zinc, however, will cause black stain. In these findings he is bearing out the contentions of C. H. Proctor who finds that iron gives a whiter nickel, and that it does not cause it to rust readily, as is generally believed. As a result of the discussion following this paper, it was decided that the Bureau should go into further research for more definite and practical data on iron and nickel composition.

"The Relation of Cathode and Anode Efficiency" was handled by PROF. O. P. WATTS, of Wisconsin University, and **"The Efficiency of Hot Nickel Solutions Under Mechanical Conditions"** was discussed in an able paper by M. MARTEL.

JACOB HAY discussed **"Cleaning Solutions,"** while **"The Separation of Gold and Platinum as Found in Filings and Trimmings"** was discussed by JOS. SIMPSON. M. R. THOMPSON gave a fine exposition on **"The Acidity of Nickel Solutions."** He also, in collaboration with C. T. THOMAS, discussed a paper **"Effects of Impurities in Nickel Solutions."** L. D. HAMMOND had a splendid paper on **"Conductivity of Nickel Solution,"** in which he proved that ammonium chloride was one of the best additional agents for conductivity in such solution. W. P. HUNTER, of The Egyptian Lacquer Company, gave a most interesting talk on lacquers, showing the composition of lacquers from seed lac and shell lac to the nitro cellulose. He also gave detail for prevention of failing coats of lacquer, which are due, he said, to moisture and impurities that are picked up in some of the methods that are used. He declared that a lacquering surface needs as much careful cleansing as a plating surface, and the failure to recognize this causes many failures.

"Rust Proof on Iron" was discussed by W. J. BELL, of Philadelphia, and an extremely interesting paper on **"Nickel Plating Automobile Bumpers,"** written by J.

PLATERS AT THE TENTH ANNUAL CONVENTION

ANDREW WARNER, of The New Era Company, Grand Rapids, Mich., was read by WALTER J. ALLEN.

NOTES OF THE CONVENTION

On Friday, the third day of the convention, the delegates and ladies were taken to Coney Island, Cincinnati's river resort, for dinner and outing. The party boarded the steamer Island Queen at 11 o'clock, and enjoyed dancing on the way up the river. Dinner was served at the Club House at the resort, after which there was "some" ball game between teams representing the "East" and the "West." The "West" cleaned up the effete "East" by a score of 17 to 13, in seven innings. Rud Hazuka was captain and pitcher of the "West" and Tom A Trumbour managed and pitched for the "East." The umpiring was done by Bill McCabe and Thomas Buchanan, and there were the usual stony-hearted, dissatisfied catcalling rooters. They didn't seem to take sides for any purpose—all they wanted was to let off steam—and the lookers-on had more fun than the players. Of course the under-dogs had an excuse for "their luck." Tom Trumbour blames it on "Cyanide" Schneider, whom he put on 3rd for the "Easts," and Schneider was so successful in fumbles and other things a good ball player shouldn't do that the "Wests" scored 7 runs in the first inning. But there's no use in going into the thing further—arguments won't help, for the result of the game shows that when "East" met "West" it was quickly demonstrated that the star of the west is still high in the heavens.

The real event of the meeting was the banquet in the ball room of the Hotel Gibson, on Thursday evening. Nearly 300 were seated, and, after a splendid dinner, with music, the evening was given over to entertainment. One of the features was a series of cartoons by the cartoonist on a Cincinnati daily newspaper, who, in fine style, "showed up" some of the big fellows in characteristic take-offs.

Motion pictures showing the process and plant of the American Rolling Mills Company, Middletown, Ohio, manufacturers of "Armco" iron, were shown. The pictures were very clear and gave those present an understanding of the reasons why "Armco" possesses the properties that its manufacturers claim for it.

Two of the speakers scheduled to read papers before the meeting were prevented attending because of misfortunes. One paper was to have been on **"Corrosion; its Causes and Prevention"**, by G. W. KOPF, Research Engineer of the Davis Sewing Machine Company, Dayton, Ohio. Mr. Kopf was prevented attending by the death of his six-year-old son. The other scheduled speaker who could not appear was DR. W. BLUM, of the Bureau of Standards, Washington, D. C. According to information available at the meeting, Dr. Blum was attacked by a partial blindness. No information was available as to the seriousness of the attack. Dr. Blum was to have read a paper on **"Nickel Plating"**. The convention appointed a committee to send to each of these men expressions of sympathy.

The Baltimore Copper Smelting & Rolling Company, Baltimore, Md., was represented by G. F. Stanton, who passed out a unique business card in the shape of a copper plated piece of tin. The lettering is done on the copper side of the "card" and the letters have the appearance of a raised glassy surface. The card was very clever and attracted a great deal of attention, particularly to the character of its workmanship.

Another useful souvenir was given away by the Matchless Metal Polish Company. This is a little sliding card which shows the surface feet measurement of buffs when the revolutions per minute (R. P. M.) is known. The calculation shows measurements of 6″, 8″, 10″, 12″, 14″, 16″, 18″ and 20″ buffs., at speeds ranging from 1,200 R. P. M. up to 3,000 R. P. M. This is a handy device, and the Matchless company will gladly send one upon request.

The following is a list of exhibits:.

THE EGYPTIAN LACQUER MANUFACTURING COMPANY, New York.—Demonstrated their cracked enamel, a new line of imitation leather finish on metals. The display created a great deal of interest among the platers. This is a cold application process. All the other lines of this company were displayed to advantage. The exhibit was in charge of L. N. Roberts, assisted by B. Poper, N. P. Hunter, George M. Griffiths and O. D. Sopher.

E. J. WOODISON & COMPANY, Detroit.—Complete demonstration of buffing and polishing compositions. Represented by Messrs. E. J. Woodison, president; W. W. Bowring, manager composition department, and T. E. Howard, salesman for Ohio territory.

THE HILL & GRIFFITH COMPANY, Cincinnati.—Tripoli magic white finishes. Represented by John Hill, president; Bruce Hill, sales manager, and Fred W. Weisman.

THE J. B. FORD COMPANY, Wyandotte, Mich.—Complete line of their materials for cleaners. Represented by P. F. Vogelsang, Cincinnati district manager; G. J. Lawrence, C. S. Tompkins and J. S. Kelly.

THE THOMAS BUCHANAN COMPANY, Cincinnati.—Line of samples of their various products. Also exhibits of the Matchless Metal Polish Company, buff compositions; the American Cyanide Company, metal cyanides; Mass & Waldstein Company, New York, lacquers and lacquer

HELD IN CINCINNATI, OHIO, JUNE 28-30, 1922

enamels. Represented by Thomas Buchanan and W. F. Cornell.

THE OAKLEY CHEMICAL COMPANY, New York.—A complete display of plated metals of various kinds that were cleaned with Oakite platers cleaner. There were some magnificent specimens of workmanship, including a hall clock face dial, highly ornamented sword, etc. Represented by J. A. Carter, New York; Charles Ormsby, Indianapolis; Harry Barnard, Rochester, N. Y.; Phil Weis, Jr., Dayton, and J. E. Genandt, Cincinnati.

THE HANSON & VAN WINKLE COMPANY, Newark, N. J.—Exhibited a new type of interpole dynamo; master plates for phonograph records made in heavy nickel. The exhibit also contained a 25-ampere dynamo generator set, with mounted switchboard and volt and ampere meters, and it was demonstrated that a constant voltage could be maintained from one-half up to five volts. This was done by a ¼-h. p., d. c. motor connected with an ordinary electric light socket. There was also a miniature plating tank showing construction and special features of operation. Represented by Lewis Schulte, Newark, N. J.; Harry Starrett, Chicago.

BELKE'S PERFECT TANK FILTER, Chicago.—Demonstrated its new automatic clamp for quick release and attachment of the filter bag; also new suction pipe arrangement for economy of space in tank, and increasing the plating capacity. Exhibit in charge of William E. Belke and George Unberzagt, Chicago.

MAGNUS CLEANER COMPANY (Magnus Chemical Company, New York).—Complete line of their various grades and kinds of cleaners. Also samples. Represented by Edward Magnuson, W. M. Campbell and R. G. Campbell, New York.

AMERICAN ROLLING MILL COMPANY, Middletown, Ohio.—Extensive exhibit of "Armco" iron products, the exhibit occupying two booths. Representatives of the sales department of the company were present explaining processes and materials.

BIAS BUFF AND WHEEL COMPANY, INC., Jersey City, N. J.—Elaborate display of the bias buff.

EXHIBITS OF FINISHES

In the booth of the Cincinnati branch of the A. E. S.—
Dalton Adding Machine Company, parts.
Corcoran-Victor Company, auto headlight.
Hall Safe Company, safety deposit boxes.
Globe-Wernicke Company, hardware for office equipment.
Homan Manufacturing Company, plated table service.
Starr Piano Company (Richmond, Ind.), phonograph parts.

In booth of the Dayton branch of the A. E. S.—
National Cash Register Company, registers and parts.

UDYLITE PROCESS COMPANY, Kokomo, Ind.—Exhibit of various metal goods finished by the Udylite process. Represented by Fred Liscomb, James Walsh and Charles Humphrey, of Kokomo, Ind.

HOGABOOM MAKES A CHANGE

It was announced at the convention that George B. Hogaboom will leave the Scovill Manufacturing Company to become a partner and general manager of Bennett & Seeley, Inc., of Bridgeport, Conn.

Mr. Hogaboom, who is one of the best known electroplaters in the country, has an enviable record of thirty-three years in his profession. He taught plating in the Newark Technical High School for three years; worked for the War and Navy Departments during the war, traveling under the direction of the Bureau of Standards as Electroplating Advisor. After the war he was requested to become a member of the Electrochemical Division of the Bureau of Standards as advisor on electro-deposition. He still acts in that capacity.

GEORGE B. HOGABOOM

He is a member of the American Chemical Society, and for several years treasurer of the Connecticut Valley Section. He is a member of the American Electrochemical Society and chairman of the Electro-deposition Division. He is a charter member of the American Electroplaters' Society and was its first Supreme President.

His experience in electro-deposition has been remarkable in its scope. He has engaged in silver plating with the Archibald Klement Company; had job shop and jewelry experience; been head of the plating department of the P. & F. Corbin Division of the American Hardware Corporation; been in charge of the flatware department of the Rogers 1847 silverware, International Silver Company. For the last five years he has been in charge of research work on plating and finishing for the Scovill Manufacturing Company, Waterbury, Conn.

Mr. Hogaboom goes into the plating supply business wonderfully equipped with experience and reputation. The American Electroplaters' Society will miss him as an active member, but will not lose his help and advice. The whole electroplating industry joins in wishing him all success in his new venture.

Finishing Box Wrenches

Q.—We are having difficulty in attaching the abrasive grain to felt polishing wheels that we are using to polish flat box wrenches. We are using pattern makers' glue in coating the wheels; this is allowed to dry for a short time and is then stoned down with a piece of pumice stone. A second coating is then applied hot and the wheel then rolled in emery. With this method trouble has been experienced from the emery peeling off almost immediately when the wheel is used. These wrenches are made from steel forgings and are roughed off first on a solid emery wheel, which removes all rough parts.

A.—If an ordinary grain of finish is required and they have been roughed off properly on the solid wheel, use 120-grain emery. If a better grade of finish is required, use a second wheel set up with 150-grain emery. The second wheel should be used with grease applied on an old worn out buff. The utmost care is necessary in selecting and preparing the glue, the grade of glue you are using is probably cause of some of your trouble. A good grade of blended hide stock glue is best. Preheat the wheels so that the hot glue will not become suddenly chilled in setting up the wheel. After the wheels have been rolled in the abrasive let them dry thoroughly so that they become thoroughly set. They should be permitted to set for 24 hours before using in a warm temperature.

For the highest efficiency in handling this job it may be necessary to use a compressed wheel made of canvass or leather, with a medium density cushion.

If this type of wheel is used, full instructions for their use is furnished by the manufacturers. A wheel of this description, medium density cushion would be suitable for covering the entire surfaces of these wrenches if it were not desired to retain the sharp edges.—P. W. BLAIR.

The Use of Monel Metal by the Electro-Plater

Some of the Purposes for Which Monel Can be Used in the Plating Industry Because of its Resistance to Corrosion*

By O. E. SERVIS, Plater

Corrosion is one of the chief enemies of the plater and the tools he employs in his work, such as hooks, connection rods, pickling racks, baskets, etc., it is a constant source of truble, as they are rapidly attacked by the fumes and gases generally present in a plating-room. Nothing is more aggravating than to see that after a thorough cleaning of connection hooks and contact points the job has to be done over again, or that there is some faulty feature arising from improper contacts. Then again we get a new pickling basket and use it a few times, set it aside for a few days and when we want to use it again, find that it is falling apart, corrosion having attacked it.

Some time ago the writer became interested in a metal, which seems to overcome largely these objectionable features, called Monel metal. Accordingly a series of experiments were begun to ascertain just what action the different corrosive elements would have upon it.

Monel metal is not a synthetic alloy but is a natural combination of nickel and copper which is refined without changing the relation of the important elements, nickel and copper. These important elements bear the same relation to each other when the alloy is refined and fabricated as when taken from the mines. The smelting and refining merely removes the undesirable elements. Monel metal contains approximately 67% nickel, 28% copper and 5% other metals. Monel metal can hardly be distinguished from pure nickel in color; in tensile properties it closely resembles steel.

The point of interest to the electroplaters is the fact that Monel metal is, to a great extent passive to corrosion through acids or fumes, and also resistance to corrosion, or dissolving with the current in nickel solution.

The tests were made in the following manner. Five glass containers each measuring ½ pint were filled half full with the following acids:

Glass A with acetic acid 28% Commercial.

Glass B with sulphuric acid 15% Commercial.

Glass C with muriatic acid 20% Commercial.

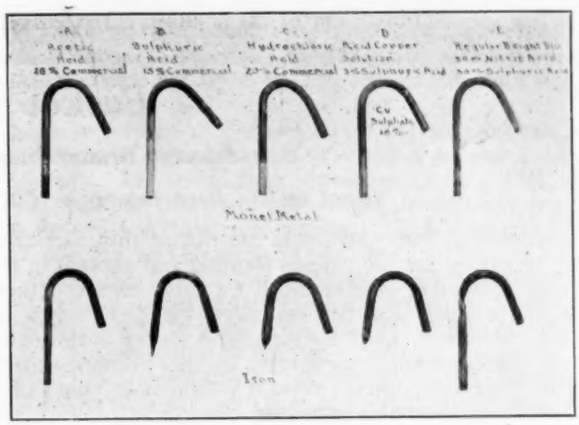
Glass D with a solution of Copper Sulphate 18° Baume and 3% sulphuric acid.

Glass E with a regular bright dip, half nitric and half sulphuric acid. (This regular bright dip was taken from brass dip made up some months previous to test and which had been in daily use for brass and copper dipping. It was, therefore, partially saturated with metal.)

The five containers with the different acids were placed in a wooden box and closed for the purpose of creating strong corroding fumes, and thereby making the acid test and the corroding test at the same time.

Under the same conditions, iron rods were used in connection with Monel metal rods; hot rolled Monel metal rods 5/16″ x 6″ and also hot rolled iron rods of the same dimensions. The iron and Monel metal rods 6″ long were bent into one way hooks 3″ one end and 2″ the other, and these hooks placed, one of each with the longer end in the different containers, with the different acids in the closed box, mentioned above, so that the hooks were immersed about 1″ in the acids, and the other 2″ of this end of the hooks were above the acids in the containers surrounded with the fumes of the individual acid from the container. The other shorter ends of all hooks were hanging over the edge of all the containers surrounded by the mixed fumes from the different acids. Every day, morning and night, the box was opened and the hooks inspected. The result was that the individual acid fumes within the containers corroded the part of the iron hooks very rapidly, forming at the same time a crystallization of different colors, according to the acid.

Iron hook A in Glass A, containing acetic acid corroded faster than all others with a black brown crystallization (acetate of iron). This crystallization, or corrosion of the part of the hook continues in connection with acetic acid fumes, expanded after four weeks to more than twice its normal size, resembling large broken warts or grapes. The part of the iron hook immersed in the acetic acid dissolved slowly, and after four weeks, half of the rod was dissolved, forming a dark solution of iron acetate.



EFFECT OF ACIDS ON MONEL METAL AND IRON

The acetic acid fumes had no effect on the Monel metal hook with the exception that a film of verdigris was covered all over the hook due to the copper alloyed in this metal. The part of the Monel hook immersed in the acetic acid had a bright appearance for the reason that the scale of the Monel Metal adhering to all hot rolled rods disappeared by the action of the acid. Whether the 5/16″ rod had lost its metal could not be determined, but it may be taken for granted that a small portion of copper went into the acid solution without showing the effect after four weeks.

Iron hook B in Glass B, containing 15% sulphuric acid was eaten away as far as immersed in the acid after 16 days, the other part of the iron hook, out of the liquid, was very heavily corroded, forming a heavy white-green crystal. (Sulphate of Iron.)

The Monel metal hook B from Glass B, with the 15% sulphuric acid showed no sign of deterioration after four weeks with the exception that the scale was removed in the acid and a film of verdigris covered the part not in the acid. Judging from this there is no doubt that Monel metal withstands the action of any strength of sulphuric acid.

The Monel metal hook C in Glass C, containing 20%

*Read at the Annual Convention of the American Electro-Platers' Society in Indianapolis, Ind.

muriatic acid showed, after four weeks continuous immersion in acid a slight tendency to corrosion, probably due to the copper partly separating from the parts nearest exposed to the action of the acid.

It is needless to say that the part of the iron hook in the muriatic acid was completely eaten away and the parts above the acid heavily corroded with brown crystals (muriate of iron).

Monel metal hook D in Glass D, containing the Duplex Solution, showed no signs of any corrosion, like test B, but it was very surprising that the iron hook in the Duplex Solution was dissolved away in less time than the iron hook in the 15% sulphuric acid solution.

Glass E, contained a regularly used bright dip of half nitric acid and half sulphuric acid. As could be foreseen, nitric acid will slowly dissolve Monel metal but the test was made inasmuch as acid would attack the metal in a regular brass dip in everyday use in the plating room. A close inspection of the Monel hook after four weeks immersion in the brass dip, showed a loss of metal estimated from 4% to 6%. The other part of the hook not in the brass dip stood up well, but had a heavier film of verdigris than under the sulphuric acid test.

While the iron hook out of the solution corroded very heavily with a slimy formation, the iron hook, like the Monel hook did not lose much metal in the solution. This may answer the question why iron dipping baskets last only a short time. It is not due to the concentrated acid while dipping, but due to the corrosion of fumes and diluted acid while standing after rinsing.

In plating departments there are many uses to which Monel metal might be applied, such as tie rods, nuts and washer on plating tanks; especially is it to be recommended as such for the pickling vats and as racks or baskets for pickling; as anode hooks or stems it will be found superior to any other metal and due to its high resistance to heat can be cast directly into Nickel anodes, making a good connection on the bus bar, due to less corrosion caused by fumes and Nickel solution spillings. It is not recommended to submerge the anode Monel hook continuously in a Nickel solution, but when submerged below the surface of the solution it will not cause any appreciable harm, at the same time forming a much stronger and more rigid support for the anode than the average copper hook. Monel metal is also woven into fine mesh with cloth interlayers, and will prove useful for filtering solutions which attack cloth or felt filters, such as strong alkaline or acid solutions.

Casket Manufacture

Statuary Bronze Finish on Solid Bronze Caskets

Written for The Metal Industry by CHARLES H. PROCTOR, Plating-Chemical Editor

I wonder if you could help me out at this particular time by giving me the proper formula and procedure for getting a statuary bronze finish on solid bronze caskets (the above finish is sometimes called Venetian Bronze as well). However, what we require is a very dark brown finish, the same finish as is used by the Belmont Casket Co. on their solid bronze cases. Would it be convenient for you to answer the following questions:

1. Do they buff the caskets before plating?
2. How long do they leave the casket in the cyanide copper solution?
3. How many ounces of liver of sulphur do they use to the gallon of water for the oxidizing solution?
4. What process is used for oxidizing the caskets? Are they dipped in the liver of sulphur solution or is the solution applied with a fine brush or a fine pumice?

Our object in asking the above questions is that we may get an even dark brown color all over the surface of our solid bronze caskets, which are 6′ 3″ long by 24″ wide.

A.—1. The caskets made of bronze are only lightly scoured down before copper plating, usually with a mixture of finely powdered pumice stone and powdered flint. Of course, this is with the presumption that the bronze used in making up the caskets has been polished on one side of the sheet.

2. If the copper cyanide solution is made up as follows and used warm, the caskets are left in it not more than 15 minutes:

Water	1 gallon
Sodium Cyanide	6½ ozs.
Copper Cyanide	5 "
Bicarbonate of Soda	1 oz.
Bisulphite of Soda	½ "

Voltage 4 to 5. Temperature 110 deg. Fahr.

The bronze sheets are purchased polished on one side. Good manufacturers have facilities for polishing such sheets. Their buffs are frequently 36 inches in cutting-surface area.

3. The best results are obtained with sulphide of barium on casket work, especially when dark brown tones are required. However, polysulphide gives excellent results, although it is much more powerful as a sulphurizing factor than the barium salt so that less than one-half by weight should be used as compared with the barium salt.

A stock solution should be prepared using at least eight ounces of sulphide of barium per gallon of hot water and polysulphide solutions with half the amount. The stock solutions should be bottled and kept tight from the air.

Just so much of either solution should be added to cold or lukewarm water as will produce the desired tone.

4. The best results are obtained when the oxidizing medium barium sulphide or polysulphide is mixed with water from the stock solution, and definite proportions of powdered pumice stone and powdered flint are mixed with the solution. It is advisable to use a cheap flour in sufficient quantities to keep the pumice stone and flint from settling.

The mixture is applied to the casket with soft tampico brushes always working with straight backward and forward motions. Wash the surface frequently with a hose connected with the water faucet in order to prevent an excess of the oxidizing medium remaining upon the casket which would darken the tone excessively. It is possible that the barium solution could be applied first, and then the light brushing and washing with water follow afterwards. Both methods are in vogue.—C. H. PROCTOR.

BUFFING HARD RUBBER

Q.—What is the best speed at which to run a buffing wheel on hard rubber specialties?

A.—The rate of speed to use for buffing hard rubber specialties to get the best results is 7,500 feet per minute or 1,750 revolutions per minute. P. W. BLAIR.

Japanning

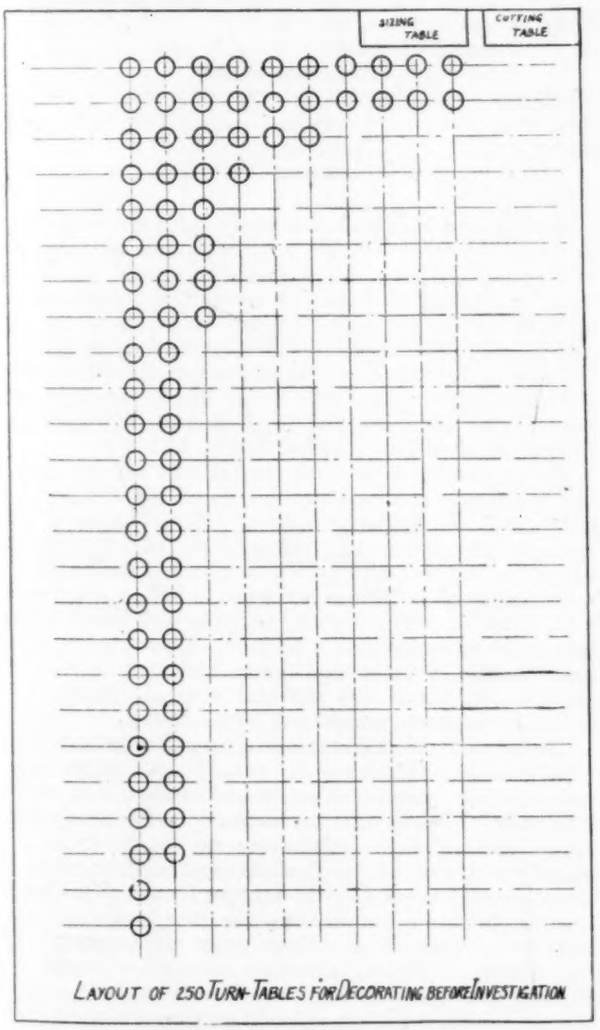
A Description of the Methods by Which the Rule-of-Thumb Operations of an Old Art Were Changed to Standard Operations. Conclusion.

Written for The Metal Industry by S. R. GERBER, Industrial Engineer*

In this operation a border design and a trade mark of decalcomania were transferred on the bowl of the frame. Considerable difficulty was here encountered, due to variable atmospheric conditions and judgment of the decorator. Consequently expert help was required, and at that, there was always a shortage of production in this department and great loss because of defective work and wasted decalcomanias.

Previous to the investigation the following process was employed.

About 250 turn-tables were set in the room as illustrated in the sketch.

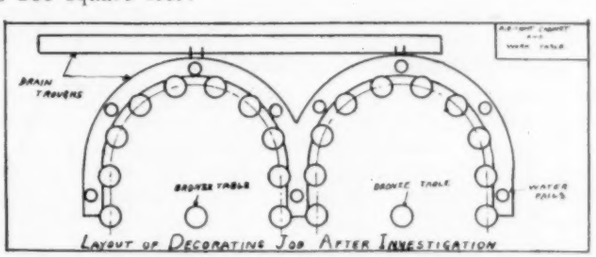


ORIGINAL TURNTABLE LAYOUT

The process of decorating with decalcomanias consists of sizing the face of the transfer with a special varnish and having it stand until it becomes tacky, so as to make it adhere to the japanned surface. Then, by soaking the back of the transfer paper with a sponge and water, the decalcomania will be released from the paper and remain adhered to the frame. The paper is then readily pulled off and all surplus size is washed off the surface of the frame and from the transfer. This is done with a rag and pentine; finally the surface is wiped clean.

To carry out this process the decorator sized a number of transfers and allowed them to become dry and tacky. The number sized at one time depended on the atmospheric conditions and the decorator's skill. He then proceeded to place the transfers on the frames until he covered about 25 or 30 frames. He returned to the first stand and with a small pail of water in one hand and a sponge in the other, proceeded to dab each transfer until the paper was wet enough to be removed. Frequently, in this routine, the sponging would require more time than was calculated and when the last few frames were reached the transfers had dried on too fast to be removed and had to be scraped off. After all the papers were removed, the decorator returned again to wash off the size and clean his work. He would then repeat the entire performance when placing the trade mark transfer between the two bands which he had just finished. This duplicated both the dabbing and cleaning operations.

When the first 25 or 30 frames were finished, the decorator's helper removed them from the stand and placed them on a truck ready for delivery to the assembling department. In the meantime the decorator continued with another lot of frames. In this manner, in the course of a day, both men completed about 250 frames of which about 25 per cent. had to be either re-decorated or retouched. The main problem here, obviously, was to eliminate, if possible, the variables due to the human element and to the atmospheric conditions. When this was accomplished, the production was increased from 250 to 450 with the same decorator and helper; reworks were reduced to less than 3 per cent., and the floor space occupied by this operation was reduced from 4000 sq. ft. to 200 square feet!



REVISED TURNTABLE LAYOUT

To overcome the difficulties due to atmospheric conditions an air-tight cabinet was built in which were placed the transfers after they were sized. Under these conditions it was possible to size over two hundred sets of transfers. After they became tacky they were placed in the drawers of the air-tight cabinet where they maintained the tacky state for three or four hours.

Time and variations due to the human clement were eliminated by re-arranging the layout of the entire job in the following manner. The turntables were arranged as shown in the sketch.

In this new arrangement there were only 20 turntables set in two semi-circles of 10 each, and two extra tables

*President S. R. Gerber Company, New York. Member A. S. M. E. Part 1 was published in our June issue.

on which to stand the pot of aluminum bronze. At the back of the turntables there was placed pails of water, one between each two stands, and two strips of felt large enough to cover the surface to be decorated were placed in each pail. The layout was equipped with drain troughs to carry off the surplus water.

The helper placed 20 frames on the turntables and proceeded to bronze the inside of the bowl casing. This operation was included in the decorating operation to fill up the helper's time. He also removed the finished frames from the stands and took care of the supplies.

The decorator worked on one set of frames while the helper did his work on the other. When the transfers, both bands and trade marks were placed on ten frames, the decorator went back to the first frame and proceeded to place a wet felt on each. While this process of soaking the paper was going on, the decorator placed transfers on the other ten frames. This allowed sufficient time to soak the transfers on the other set and saved the time it took the operator soaking off the paper with a sponge as he formerly did it. He then returned to the first set of 10 frames, removed the papers and washed off the surplus size. In the same manner the other set of frames were disposed of.

This routine was considerably more simple and eliminated the human element and expert judgment to a great extent. The production increased and the quality of work greatly improved.

STRIPING

Either before or after the decorating operation the frames were striped with a thin gold stripe for decorative purposes. One of the difficulties encountered here was that the stripe would rub off in handling even after it was dry. Therefore a study of the best method of mixing gold bronze for striping was undertaken with the view of obtaining both ease of application and durability.

Different proportions of powdered gold bronze, pentine, Japan gold size, and oil were mixed and stripes made with each mixture. After drying for three days, the stripes were washed with several solutions,—washing powder, soda water, turbine oil, lard oil, and mineral lard oil. Where the quantity of pentine used in the mixture was high, the stripe washed off readily with the washing powder or soda water solution. In other instances, where the percentage of bronze powder used was low, the stripe did not have the required lustre. The mixture that contained oil was easy to apply, it flowed freely from the brush, but it did not have a bright lustre.

The experiments are tabulated below.

EXP. NO.	GOLD SIZE (OZ.)	GOLD BRONZE (OZ.)	PENTINE (OZ.)	OIL (OZ.)	COLOR OF STRIPE	STRIPE REMOVED BY: GOLD DUST	STRIPE REMOVED BY: SAL SODA	STRIPE REMOVED BY: OILS	REMARKS
I	1	1	...	...	Rich	No	No	No	Mongol
II	1	1½	½	...	Rich	No	No		Size
III	1	3	2	...	Dull	*Diff.	...	...	Used
IV	1	2	1	...	Dull	Diff.	...	...	
V	1	2	1½	...	Dull	Readily	...	...	
VI	1	2	1	...	Dull	Diff.	Readily	...	Japan
VII	1	1	⅛	⅛	Rich	No	Partly	No	Dryer
VIII	1	1/3	1/3	...	Dull	Partly	Readily	...	used in
IX	1	½	⅛	⅛	Dull	Yes	...	...	place of
X	1	¾	⅛	⅛	Bright	Partly	Partly	No	Gold
XI	1	1/6	...	...	Very Dull	Partly	Yes	...	Size

*Diff. = with difficulty.

From the above we have concluded that Formula No. 2 will give the best satisfaction. The striping liquid will be kept in an oil can and only a quantity sufficient for about ten minutes striping is to be poured into a small dish about ¾ in. in diameter and ¼ in. deep. Pentine is to be used only for washing the striping stencil about every half hour.

ALUMINUM BRONZE POWDER

In connection with the use of aluminum bronze on the frame and also because some frames were entirely coated with aluminum bronze instead of black japan, an investigation was made regarding the correct mixture of bronze for lustre and durability, and also to determine the length of time and temperature required for baking. The same series of difficulties were encountered here as in the use of black japan,—dirty brushes, dirty paint, unscrupulous use of thinning agents, and careless mixing of paint.

Spraying was substituted for brushing; the aluminum bronze was mixed in the stock room and all thinners taken from the workmen; the new covered paint pots were adopted for cleanliness; and a series of experiments were made to determine the proper method of mixing the aluminum bronze.

It was found that to obtain the desired finish and durability, it was necessary to mix

2 quarts of Rubbing Varnish with
1 pound of Aluminum Bronze.

First spray one coat and bake for one hour at 200° F.; then spray the second coat and bake for one and one-half hours at 200° F.

To obtain this information the following tests were made:

Mixing and Baking. A mixture made with two quarts of No. 1 rubbing varnish to one pound of aluminum bronze and one quart of pentine was applied to a frame. This was baked in the steam oven at a temperature of 220° F. for forty minutes. When taken out of the oven the paint was soft, and was slightly harder when it cooled. A second coat was applied to this frame with the same paint. This was baked in the steam oven at 220° F. for one hour and forty minutes. A very hard surface resulted but it lacked lustre.

To improve the lustre, the pentine was omitted entirely and a mixture made of two quarts of No. 1 varnish to one pound of aluminum bronze. This mixture, at first, seemed difficult to apply on account of its being too heavy, so varnish was added until the solution became three quarts of varnish to one pound of aluminum bronze.

A frame was coated with this paint and baked for one hour at a temperature of 220° F. when cooled, it was hard enough to be rubbed down, and another coat was applied and baked for one and one-half hours. The finish was extremely hard and had a lustre.

To improve the brightness of this paint the amount of varnish in the mixture was reduced until it was again two quarts of varnish to one pound of aluminum bronze. The painter, being more accustomed to the heavy paint, found this mixture satisfactory now. A frame was painted with this mixture and the first coat baked in the steam oven at about 210° F. for one hour and the second coat at the same temperature for two hours, giving a very satisfactory finish. Some parts were sprayed with this heavy mixture to ascertain whether it would pass through the spraying nozzle. The heated air used in spraying thinned the varnish and produced a good spray.

Durability Test. A strong solution of gold dust washing powder was made to be used to wash off the aluminum coat of paint on the last frame painted. To make the test thorough the solution was spread on the side of the frame for ten minutes and then rubbed vigorously with a rag. No paint was removed. Similar treatment was given to a part painted with the mixture containing pentine and not baked but allowed to dry in

the air for about three weeks. This washed off entirely after several minutes of vigorous rubbing.

CHARTS

The density of japan may be increased or decreased by either adding turpentine or heating or both. A series of tests were made the results of which are charted here, to determine the ratio and proportion of these changes. Chart No. 1 may be used to ascertain hydrometer readings at various temperatures with various percentages of pentine in the japan. From Chart No. 2 we can obtain the percentage of pentine in a solution of japan, knowing the hydrometer reading, and vice versa, at various temperatures.

FORMULAE

Putty { Japan—2 gal. / Filler—45 lbs. / Pentine—½ gal.

Japan, 1st Coat—Hydrometer reading 26° B. at 70° F.

Japan, 2nd Coat—Hydrometer reading 28° B. at 70° F.

Striping Gold { Gold Bronze—1½ oz. / Gold Size—1 oz. / Pentine—½ oz.

Aluminum Bronze { Varnish—½ gal. / Alum. Bronze—1 lb.

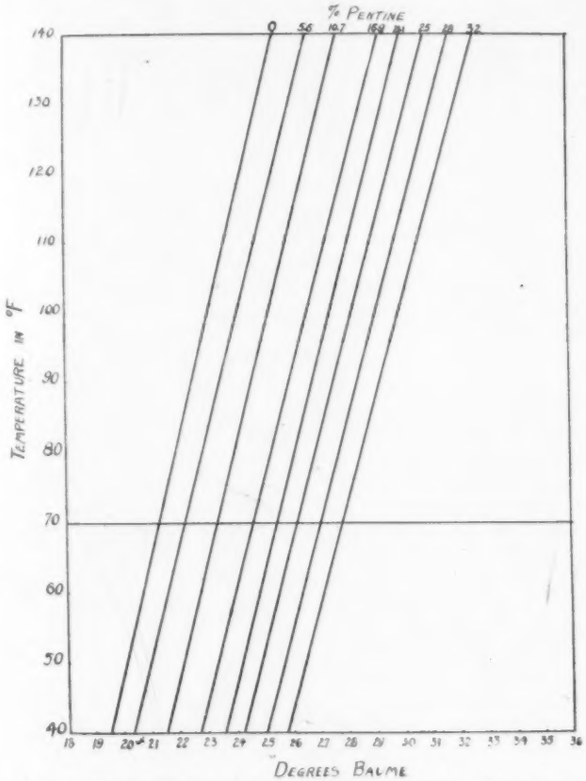


CHART 1—HYDROMETER READINGS AT VARIOUS TEMPERATURES

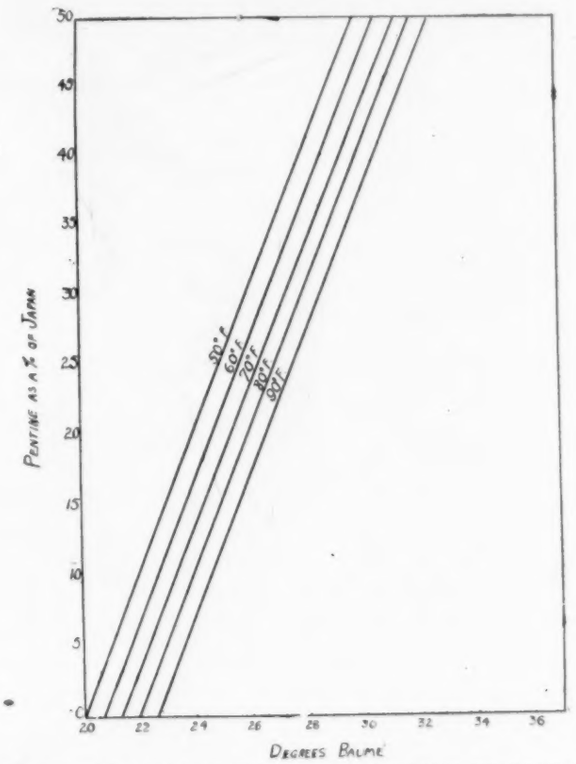


CHART 2—RELATION OF PENTINE TO HYDROMETER READINGS

Tinsel

Q.—In connection with the report you so kindly sent us recently regarding the preparation of wire which is finally manufactured into Christmas Tree Tinsel, this reads: "The silver tinsel is a silver deposit upon copper wire drawn down as outlined and finally rolled to a tinsel."

Will you kindly advise us further whether this silver deposit might be accomplished by plating the wire, or whether it goes through a process similar to that described for the zinc treatment?

A.—The copper wire used as a basis for the silver tinsel is soft copper wire about 20 B. & S. gauge. This wire is electro-silver plated, about one pound of metallic silver is deposited upon 100 lbs. of wire.

After silver plating, the wire is drawn down by continuous stages by the aid of diamond dies until the final size is reached.

The fine silvered copper wire has, at this stage, a high lustre. In this condition it is shipped to the tinsel manufacturers who roll it flat to produce the tinsel. Highly polished steel rolls are used for the purpose, and many strands are rolled at one time.—C. H. Proctor.

Heating Metal Patterns Electrically*

To overcome the collecting of moisture on metal patterns, foundrymen resort either to the use of parting compounds or to devices for heating the pattern. The author describes these two methods, as generally employed, and points out the various disadvantages of each. In most cases, heating is done by means of a gas or kerosene torch. The manager of a radiator plant experimented with electrically heated patterns, using a device improvised from electric sad irons. His first trials indicated that the method was feasible, and in perfecting the heating apparatus, he learned of the steelclad type of heater, which he installed on two patterns. The success of these heaters led to the installation of 15 others. The author describes these units and explains how they are applied. The electric heaters are said to have numerous advantages over the gas and oil heaters and the cost is claimed to be favorable in comparison with other methods. Simplicity, convenience and cleanliness are advanced as three important characteristics of the electric heaters.—C. A. Cremer.

*Abstract of a paper read at the Rochester Convention, American Foundrymen's Association, June 5-9, 1922.

Sulphides as Bronzing Agents

Methods of Making Sulphides and Applying Them. A Few Tricks of the Trade. Conclusion

Written for The Metal Industry by ARAYEL

FACTORS INFLUENCING SHADES PRODUCED

These are the factors that influence the production of colors.

1. The composition of the material worked upon if it is an alloy and the accidental impurities it may contain if a single metal.

2. The physical structure of the metal, whether it be cast, soft-rolled, or compacted by pressing, drawing and spinning; if it consists of an electroplate, whether the electroplate is deposited close grained and smooth, coarsely crystalline, or accidentally or purposely burnt.

3. The nature of the base metal that bears the deposit.

4. Dilution or concentration of the solution used and its temperature from cold to boiling hot.

5. Whether or not the object worked upon comes in contact with the solution container if the container is of a metal capable of setting up electrical action with the metal worked upon.

6. Whether the surface of the metal worked upon is dead or polished and the manner in which the dead surface is produced.

7. Whether or not the metal is re-dipped in a toning solution.

8. Whether or not the toning solution is hot or cold and in which one the metal receives the first dip.

9. Whether work is scratch-brushed wet or dry, or not at all; and whether or not it is brushed between successive dippings.

10. Whether or not the toning solution contains a metallic salt or consists of plain dilute acid.

11. The nature of the metallic salt; whether it is one which in solution has bronzing properties such as iron or copper nitrate, chloride, or copper sulphate.

12. The length of time of the immersion. Whether or not the articles are thoroughly rinsed after each dip or the solutions allowed to dry on them.

13. Last but not least, the temperature of the hot water or oven used in drying.

In production work where only a brown or black is wanted by way of contrast without much regard to a particular shade the process is a matter of dipping in a solution until the color is reached, then rinsing, drying and afterward scratchbrushing. But where finishes, coming from different sources of production have to be matched for dealers in lighting fixtures, builders' hardware or antiques, the process is one of manipulation. By manipulation only can the yellow stain, imparted to brass by liver of sulphur or lye sulphur solution be worked into light or dark shades of brown. To color brass parts intended to convert Chinese or Japanese bronze vases into portable lamps calls for individual processes for each one of a mixed lot and often experimentation to see if the new parts actually match so that they appear to be parts of the original vase.

But in all cases where such parts are made to match they are only an illusion to the eye and a delusion to the operator if he thinks he has equalled the Oriental's art. For example, a vase was said to have been in the owner's family one hundred years; color, dark reddish purple that appeared almost black from a short distance; pieces after polishing were deadened with a fine brass wheel-brush, pumice and water; then lightly coppered; then dipped in dilute liver of sulphur solution to blue, green, crimson, purple variations; rinsed, dipped in nitrate of copper solution; rinsed, scratch-brushed wet. Three or four of such alternate dippings and brushings, followed by dry scratch-brushing after drying out, and finally lacquering with a clear lacquer gave a perfect match and prompted exclamations of surprise and admiration from the owner; said exclamations prompting the asking for a few more shekels by the boss.

Question.—Will the finish so produced stand handling for one hundred years?

MISCELLANEOUS MIXTURES

If as one authority* tells us, that when antimony sulphide is dissolved in caustic alkali, the solution contains dissolved antimonous oxide together with potassium sulphide, then it is reasonable for me to suppose that a solution, formed by dissolving an oxide such as the oxide of lead, tin, antimony or white arsenic in lye water, and then adding a solution of an alkaline sulphide, ought to approximate in bronzing action one made direct from the respective sulphides. Half a pint of arsenate of soda solution was made by boiling a small amount of arsenic with enough sal soda to effect solution; about one fourth ounce of liver of sulphur was dissolved in another half pint of water. Neither solution gave a pronounced stain to brass in the cold. They were then mixed and gave a flocculent precipitate; the mixed solution gave no pronounced stain to brass. A little more lye was added to clear it a little and heat was applied. It then gave to brass a golden brown that rapidly passed into dark blue and finally bluish grey.

White lead used in the same manner in connection with lye sulphur solution will impart a deep golden stain to brass in the cold which will deepen to a reddish bronze if the solution is heated. The golden stain can be darkened to a pleasing light brown. First, dip in sulphide solution, then rinse; then dip in moderate sulphate of copper solution. In making up a solution of this kind enough lye has to be used to effect a solution, but great excess avoided. Too much lye, over concentration and hot solution, gives a reddish bronze immediately, but non-adherent. I never had occasion to use these two solutions in actual practice, but the experiment showed that if circumstances demanded I could skin a cat with the contents of a can of paint and then tie the can to the tail of my worry.

I have not written this for the expert who, by a sort of intuition, knows how to proceed after producing an initial stain, but for the young man, who may have to go through the mill as I have gone, who even now may be starting his career in a stove foundry, where the plating room scales have a fender standard for a tare, where molding consists of "tramping" down all the sand one can shovel in a flask, where good castings look as if they were made by a volcanic eruption and bad ones as though they just happened in a universal cataclysm, where everyone thinks the plater does not know as much as the first plater they had back in 1880, because he doesn't boil his solutions down in an iron kettle every six months, or run half into the sewer and make up fresh.

*Part 1 was published in our issue for June, 1922.

*Fownes', Elementary Chemistry, 1850.

Testing Materials Society Meeting

A Report of the Session on Metals and Corrosion

On Tuesday, June 27th, the session on Non-ferrous Metals and Corrosion, of the 25th Annual Meeting of the American Society for Testing Materials was held in Atlantic City, N. J. The meeting was of great importance and was very well attended.

Before the technical work was undertaken, ballots for the election of officers were counted and it was afterward announced that G. K. Burgess, Bureau of Standards, Washington, D. C., was elected President; W. H. Walker, Professor of Chemical Engineering, Massachusetts Institute of Technology, Boston, Mass., was elected Vice-president, and that the Executive Committee would consist of Messrs. D. M. Buck, W. M. Corse, W. K. Hatt and J. R. Onderdonk.

Dr. Burgess in his speech of acceptance outlined the work for the A. S. T. M. for the coming year, which he divided into three parts.

1. To co-operate with the American Engineering Standards Committee so that A. S. T. M. Standards would be accepted by that organization and be used as general American standards.
2. To make A. S. T. M. Standards available abroad so that exports of American materials might be facilitated.
3. To make A. S. T. M. Standards available to the Federal Specifications Board so that the work of that Board in unifying Government standards might coincide with the specifications of the A. S. T. M.

PAPERS AND REPORTS

Committee B-1 on Copper Wire recommended that specifications for trolley wire be separated from the general specifications for hard drawn copper wire (B 1-15). The committee hoped that next year they might report specifications for copper trolley wire which would be offered for approval jointly by the American Electric Railway Association, and the American Society for Testing Materials.

Committee B-2 on Non-Ferrous Metals and Alloys reported on the preparation of three tentative specifications.

1. Specifications for brass pipe—standard sizes.
2. Specifications for copper pipe—standard sizes.
3. Specifications for seamless admiralty condenser tubes and ferrule stock.

Two tentative methods of chemical analysis were submitted.

1. Brass ingots and casting.
2. Bronze bearing metal.

Two tentative specifications were recommended for advancement to standard.

1. Specifications for nickel.
2. Brass ingot metal, graded and ungraded for sand castings.

A paper on **Physical Properties of Some Copper-Silicon-Aluminum Alloys Sand Cast** by E. H. Dix, Jr. and A. J. Lyon was read for the authors by P. D. Merica. The paper stated in substance that during the past year the Engineering Division of the Air Service at McCook Field, Dayton, Ohio, has found that the addition of silicon to aluminum is very advantageous. As regards foundry practice the alloys may be cast around hard cores without danger of cracking, and the tendency to shrink and draw between thick and thin sections, is much less than in most aluminum alloys. However, the silicon-aluminum alloys are very difficult to machine. The low-silicon alloys tear in much the same manner as pure aluminum and the high-silicon alloys not only tear but seem in addition very quickly to dull the tools. For this reason additions of copper were tried and found greatly to improve the machining qualities.

Committee A 5 on Corrosion of Iron and Steel reported on preservative metallic coatings for metals under test and on inspection, at Fort Sheridan, Pittsburg and Annapolis. Those failures which occurred under atmospheric exposure occurred in the non-copper bearing light gauged sheets. Seventy per cent of all the non-copper bearing sheets have shown failure at the end of 64 months' exposure, while no failures have occured in the copper bearing sheets.

The Sub-Committee on total immersion tests reports that there have been no failures in the test racks during the past year, but that there might be some failures before long. The test racks are being carefully watched.

A paper on **Preliminary Notes on Corrosion** by Wilder D. Bancroft was read for Dr. Bancroft by W. M. Corse. The paper called forth considerable discussion. The general feeling throughout the meeting seemed to be that many of Dr. Bancroft's suggestions were very stimulating and that work would have to be done along the lines he had indicated. The work laid out, however, was very broad in scope and not very easy to cover. Dr. Bancroft pointed out that the important point to be considered in studying corrosion was the formation of a protecting oxide film for the metal. "We must determine just what sort of a film is formed when copper bearing steels are exposed to atmospheric corrosion and we should then show that this same sort of film is not formed or does not protect when these steels are immersed in liquids." He stated also that what we really needed was a self-heating film.

Dr. Bancroft touched on the necessity for a rapid method of studying corrosion and stated that probably such a test would be an electro chemical one but that there was no convincing proof of this.

A paper on a **Method for Determining Spelter Coating on Iron and Steel Sheets by Measuring the Rise of the Temperature of the Acid Employed,** was read by D. M. Strickland. A measured volume of concentrated hydrochloric acid is poured into a glass tumbler. The temperature of the acid is taken with a thermometer reading to .1° C. The test piece is dropped into the acid. The galvanized coating is dissolved from the specimen and the temperature rise recorded. Each one-tenth degree temperature rise, equals a definite weight of zinc in grams. Radiation has no influence as the action is completed in about thirty seconds. All shapes and sizes of galvanized specimens can be used. The equipment is portable and can be used for field tests.

The rising temperature multiplied by an experimental conversion factor gives the grams of zinc originally carried by the test piece.

Mr. Strickland was asked how this conversion factor was obtained and answered that it could be ascertained by taking the temperature rise against a known weight of zinc coating. This weight would, of course, have to be known by an accurate analysis but once this conversion factor was obtained it would hold good.

Mr. Strickland stated also that the thickness of the sheet metal used did not affect the results nor did the particular thermometer used since all readings were simply relative.

Brass Foundry Specialists

Is Their Advice Worth Paying For?

Written for The Metal Industry by WILLIAM H. PARRY, Foundryman

When a patient or client seeks advice from a doctor or lawyer, it is tacitly understood between the two or more parties that the advice is to be paid for. The size of the fees charged is governed somewhat by the ability and experience of the men able to offer advice of value, and this is just as it should be. One would naturally suppose that this rule applies to other callings, and, perhaps it does, but there is one profession, if we call it such, to which it does not apply, and that is, the foundry advisor, or specialist.

The nerve displayed by men seeking advice on foundry matters, who have no intention of paying for same, is second only to that of the thieves who specialize in robbing the poor boxes that decorate the interiors and exteriors of our churches.

The technical press that gives more or less valuable space to the answering of questions bearing on the foundry industry gets its compensation so, through the "copy" it furnishes to its columns. There are occasions, however, when the staffs of these magazines are not able to hand out their gratis advice, and the seeker, who, it is assumed is also a reader of their publications, is wished on some poor boob who has established a reputation, deservedly or not, for being the last word on foundry lore.

A recent occurrence, so recent in fact as to be painful, will serve to emphasize and explain just how this gentry of "spendthrifts" operate.

An iron founder who knew as little about brass foundry practice as a blind cat does about shooting clay pigeons, was suddenly confronted with the problem of equipping and operating a brass foundry; this little stunt of itself ought to keep one man busy, but, the generous concern by whom he was employed as a superintendent of a "fifty-ton" iron foundry, evidently figured that his time was not entirely occupied as such.

Now with all due respect to the iron founders, it must not be supposed that because iron foundry practice and management calls for skill of a very high order, that men who have devoted the best part of their lives to this industry, are fitted to tackle the non-ferrous game, as anybody experienced in its intricacies can testify. Instead of hiring a brass foundry executive who knew his business, and the woods are full of them, this thrifty (?) concern sought to kill two tom cats with one bootjack, with the result that their superintendent was compelled to seek advice from a specialist in brass foundry practice.

To say that this man needed advice, does not exonerate his employers from the charge of boneheadness in foisting this job on the shoulders of an already very busy man, and, to add to his troubles, they suggested, that, as the electric furnace, according to some dope they had read or heard of, was now in successful operation, that he consider the purchase of at least one of these current consumers as a starter. That's where the specialist came in by advising him to forget the installation of any such animal, at least for the time being, or until such time as all the experiments with this type of furnace had proved its reliability and worth.

Having knocked the props from under the electric furnace, a job that was very easy to do when the staggering price of just one was mentioned, they insisted on the specialist designing a pit furnace, never thinking for a moment that such could be bought in the open market at a price that would not cover a set of drawings.

Three pit furnaces were installed on the specialist's advice on the grounds that, as the foundry-to-be was located in the very midst of the Pennsylvania coal and coke country where "at the mine" prices prevailed (plus haulage, of course), it would be folly to consider installing any other type of furnace, including open flame, oil or gas fired. Then followed in succession the proper sands to use, types of crucibles, air hoists and the other paraphernalia necessary for the proper operation of a brass foundry.

From all accounts the venture was a success from the start, both ways, by which is meant they turned out good castings and made money pretty fast.

This would seem to be the end of this story, but it isn't, as, not satisfied with their success, they wanted to make more money by using as much scrap brass as the traffic would bear.

Figures were given, and formulae provided, to enable them to "doctor up" their mixtures, and everything went along lovely, until they received a large fat order for coal mine screen plates, with holes so close together that the metal between them left mighty little space for its proper flow.

As the specifications would not permit the use of any spelter in the mixture, it being classed as an acid-resisting metal, they had attempted to cast these plates from the first melt, in green sand, not even skin dried, and this, with a plate 30 inches long, 14 inches wide, and $\frac{5}{8}$ inch thick, with as many holes in it, and of small diameter, as there possibly could be in a hundred pounds of Swiss cheese. Of course they lost a lot of castings; the wonder is that they were able to make any.

Again the specialist was consulted, and once more, and for the last time, they were advised as to how such castings were made by men who knew their business, and with this advice a bill was rendered for past services, which has not been paid, nor is it expected it ever will be, due probably to the compensation (?) received from this source in the past, which consisted of a dozen packs of cigarettes, one box of cigars of a brand closely allied to horseradish in smell and taste, and one bill fold, the receipt of which led the specialist to believe that possibly bills of large denominations would naturally follow along with which to fill it. This hope has not been realized as yet.

Preventing Cracks in Aluminum

A study is now being conducted by the Bureau of Mines of the causes of, and methods for the prevention of, cracks in light aluminum-alloy castings. The investigation as planned includes also the determination of the contraction in volume and of the linear contraction of a series of commercial aluminum alloys, as well as an examination of the cracking tendency of the alloys when poured into different kinds of molds. This study is being made in cooperation with the General Motors Research Corporation and a number of automotive and other foundries. The investigation is part of a general study of defects in aluminum-alloy sand castings. Data have been gathered from a number of foundries as to the causes for cracks and the best methods of prevention. A number of measurements have been made in the laboratory on the contraction in volume and piping effect.

Gas Absorption and Oxidation of Non-Ferrous Metals

A Discussion of Furnace Atmospheres and Their Relation to the Condition of the Metal*. Part 1.

By B. WOYSKI[1] and JOHN W. BOECK[2]

Many writers, in discussing defects caused by oxidation and gassing of bronzes and red brasses advocate substantially the same cure for both. But from its nature, oxidation cannot take place if there is an excess of fuel in the furnace, while the gases absorbed by some alloys are products of incomplete combustion of the fuel. Hence the metal can be either oxidized or gassed, but it is doubtful whether these actions can take place simultaneously.

Oxidation can be easily overcome by the use of deoxidizers or it may be avoided by protecting the molten metal with suitable fluxes. Absorption of gases is more difficult to overcome. The regulation of the air and fuel, so as to produce complete combustion, and the protection of the bath by mineral fluxes are the most important factors. Gas expulsion, resulting in gas holes, porosity, unsoundness, and swollen or cauliflower-headed risers, is said to have several causes. One writer[3] lists the most common causes in the order of their importance, as follows: Superheated metal, dirty or slaggy furnace conditions, using metals low in quality or those previously subjected to bad melting practice, poor grade of fuel, use of newly lined or damp ladles, indiscriminate mixing of scrap or illogical combinations of metal.

Superheating the metal usually occurs when the heat is ready to be poured but for some reason must be held in the furnace. In this case, a careful furnace tender tries to avoid overheating the metal by keeping a mild fire; that is, a reducing fire which, unfortunately, results in gassing the metal.

A dirty, slaggy furnace may result in gassing the metal by retarding the heating and prolonging the time necessary to bring the metal to the proper temperature, thereby increasing the chances of gassing in uncertain furnace atmosphere.

It is doubtful whether metals of low quality have anything to do with gassing molten metal, except, possibly in the case of metals containing sulphur. The sulphur may produce gas holes as a result of a reaction with occluded oxides. The reaction between sulphur and copper oxide is reversible, depending on pressure and temperature.

Metal that has been subjected to bad melting practice, whether oxidized or gassed, can be brought back to normal conditions by proper furnace practice. In the case of oxidized metal, a deoxidizer or a flux is necessary. In the case of gassed metal, a strongly oxidizing furnace atmosphere of relatively high temperature, so as to produce quick melting, will correct the gassed condition. This has been proved many times. In one case, when, on account of a change in the furnace tender, several heats of red brass were gassed, all the castings were returned to the furnace and melted under the conditions just described, the resulting castings were entirely satisfactory, both as to fracture and microscopical characteristics.

The use of newly lined and damp ladles may be one cause of gassing. This may be ascribed to hydrogen, from dissociated steam, being absorbed and then liberated on freezing, or after action on the occluded oxides with the formation of steam at lower temperatures; however, the dissociation of steam at the pouring temperature of bronzes is negligible.

Indiscriminate mixing of scrap and the illogical combination of metals should never occur in any foundry, but we hardly believe that it would result in gassed metal.

The most important cause of gassed metal is the atmosphere of the furnace. With the proper regulation of air and fuel, it will not take place in the case of most non-ferrous alloys. Unfortunately, the appearance of the flame outside the furnace is not a positive indication that the right condition exists inside the furnace, especially in the case of open-flame furnaces. The burners should allow intimate mixing of the air and fuel before they reach the furnace; otherwise, soluble fuel vapors may play on the surface of the molten metal.

The appearance of a casting poured from gassed metal depends much on its form and size, nature of the alloy, and the pouring temperature. In the case of red brasses, the riser may not "go down" at all, or it may go down considerably and then, at a lower temperature "come up." The casting may show gas holes under the riser, which will be different from shrink holes, or it may be solid under the riser but will not machine smooth and the fracture will be discolored. In the latter case, almost any foundryman will pronounce it oxidized. In the case of thin sections of zinc bronze, the casting may machine smooth but, if fractured, will show two layers that are easily separated; this condition also is often ascribed to oxidation. We have heard that this last condition may be overcome by hot pouring; this would indicate that the defect is a result of shrinkage due to cold pouring but it does not disprove that the defect is not caused by gases absorbed by the metal, because to get the metal very hot it is necessary to use a hot (in other words, an oxidizing) fire, resulting in quick melting with a minimum chance for gassing.

We have strong evidence that the discolored fracture is not always due to oxidation. While making bearings of leaded gun metal, it was noticed that the castings showed discolored fractures. The metal was melted in a Detroit arc furnace, sealed air tight, so that any oxygen inside the furnace was used very rapidly by the electrodes with the formation of carbon monoxide; the oxidation of the metal under these conditions was inconceivable. The addition of phosphorus, magnesium, mineral fluxes, and charcoal did not help. The same alloy, melted in the Bailey electric-resistance furnace, when poured into the same kind of molds made by the same molder, produced castings of normal fracture. The Bailey furnace is not air tight. There is an inflow of air at the bottom, through the spout under the door, and an outflow of gases and zinc vapors at the top. If the alloy melted is of high zinc content, the pressure of the zinc vapors within the furnace is sufficient to prevent the inflow of air. Thus, in the Bailey furnace there is a greater opportunity for the oxidation of alloys of low zinc content than in the Detroit arc furnace; consequently, we attributed the trouble to the absorption of carbon monoxide, which exists, in a sealed arc furnace, under pressure. The vent was then left open and the trouble disappeared; castings exhibited a clean normal fracture. Later, another user of the Detroit arc furnace stated that if the furnace is air tight during

* A paper read at the Rochester meeting of the Institute of Metal Division, A. I. M. E., June 7, 1922.

[1] Chief Metallurgist Lumen Bearing Co., Buffalo, N. Y.

[2] Assistant Metallurgist.

[3] R. R. Clark: Foundry (1919) 47,121.

melting, trouble will be experienced. The nature of the trouble was not explained, but it cannot be supposed to be oxidation.

It was also noticed on several occasions that discolored fractures appeared in bearings poured with metal melted in open-flame furnaces with decidedly reducing flames. With a decidedly oxidizing flame and a mineral-flux protection, castings of the same metal had normal fractures.

The so-called "tin sweat," or the exudation of a tin-rich alloy from bronze castings is also due to the liberation of gas absorbed in the furnace. This often happened in the past, but does not occur in our practice, since the detrimental effect of a reducing fire was realized. The tin sweat occurs most frequently in the riser. This may go down at first and then when almost solid an exudation takes place, either in the cavity of the riser, or at its edge, if the riser did not go down at all. Fig. 1 illustrates the first case and Fig. 2 the second. Fig. 1 represents a longitudinal section of the riser of a large casting containing 88 per cent copper, 5.5 per cent tin, 1 per cent lead, and 5.5 per cent zinc. The gray material is the tin-rich alloy and the black spots gas holes. In this case the evolution of a combustible gas, taking fire in the cavity of the riser on contact with the air, was seen plainly in partial darkness. Fig. 2 is also a longitudinal section of the riser of a medium-sized casting containing 84 per cent copper and 16 per cent tin.

This paper will be completed in an early issue.—Ed.

FIG. 1—LONGITUDINAL SECTION OF RISER OF A LARGE CASTING, SHOWING EXUDATION OF TIN-RICH ALLOY

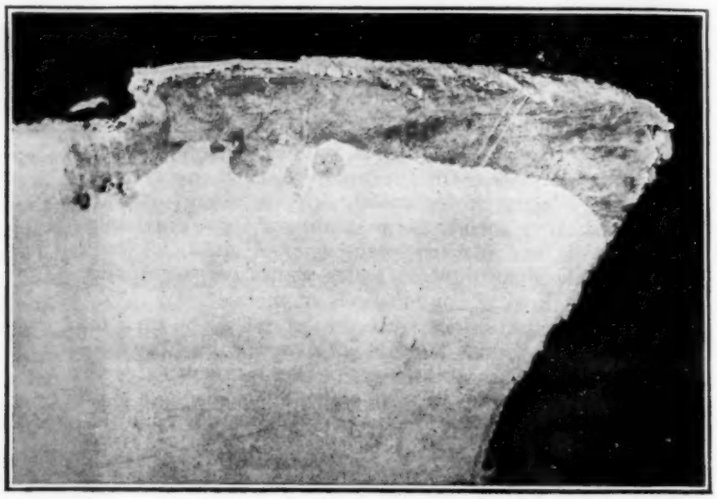


FIG. 2—LONGITUDINAL SECTION OF RISER OF A MEDIUM-SIZED CASTING

Papers Read at the Foundrymen's Convention in Rochester

Physical Properties of Cartridge Brass

By C. UTHEGROVE and W. G. HARBERT, Ann Arbor, Mich.

For low-temperature anneals, following reduction by rolling, the Brinell hardness of cartridge brass is appreciably influenced by the anneal previous to the rolling.

This influence decreases as the degree of reduction in rolling is increased.

For low-temperature anneals following reduction by rolling, the tensile strength and elongation are influenced, though to a lesser degree than the Brinell hardness, by the anneal previous to the rolling.

For cartridge brass annealed at temperatures of 650° C., or above, after reduction by rolling, the Brinell hardness, tensile strength and elongation are independent of the anneal previous to the rolling.

Effects of Impurities on Electrolytic Zinc

By G. D. SCHOLL, Keokuk, Iowa.

The tests brought out the fact that impurities, as a general rule, when within reasonable limits, do not attack the zinc deposit very vigorously during the first 15 or 20 hours of deposition. While it has been shown by Tarbell, for example, that the action of cobalt is catalytic, yet it appears that there is likewise either a preliminary concentration before the catalytic action starts, or the impurity is changed into another state before the corrosion begins. It is also quite possible that the effects of the impurities thrown out of solution or formed under the electrolytic action in the cell under test, or in the preceeding cells when the former is not a top cell, might easily retard or disguise the true effects of the particular impurity under investigation. The time was too limited to extend the experiments to determine these points.

It is, of course, evident that the phenomena noted in these tests can be variously interpreted by different investigators. In several instances, however, the evidence appeared so convincing that the conclusions drawn should be of value as a basis for further investigation.

Tests with Cerium in Red Brass

By L. W. SPRING, Crane Company, Chicago.

The tests show that the percentage of leaded brass castings which leak rises with addition of cerium and the tensile strength and ductility of the metal decreases. Therefore, as a deoxidizer for leaded brasses, cerium has no value, as it causes segregation and spongy, leaky castings. Tests were not made on brasses and bronzes without lead, as for these or at least for the copper-zinc alloys such as the manganese bronzes, aluminum is an efficient and much less costly deoxidizer. It is well known that aluminum cannot be used in alloys that contain lead, and it appears and seemingly has been proved by these tests that cerium has a similar action with lead. It is stated by others who have tried cerium in brass that the inclusions noted in leaded brasses are cerium lead alloys.

Foundry Difficulties

A Statistical Survey of Difficulties Encountered by Non-Ferrous Foundries Over a Period of Years. These Difficulties Are Classified and Conclusions Drawn[1]

By ADOLPH BREGMAN[2]

This investigation, which consists of a statistical survey of the difficulties experienced by non-ferrous foundries, was prompted largely by a circular letter from the Department of Commerce addressed to THE METAL INDUSTRY along with other technical and trade journals for information about the particular industries which they served. At the time this letter was received, the investigation had not yet been made, but the need for it was plain and has become increasingly evident.

METHOD

The method of obtaining information about the non-ferrous industries was to take all the technical inquiries which had been received by THE METAL INDUSTRY since 1910 and to classify them. It was thought desirable to carry the investigation back to that date because of the numerous and sometimes sudden changes in economic conditions in the last few years. It seemed possible that there might be wide differences in the needs and the difficulties encountered by foundrymen between the pre-war, the war period and the post-war period.

The questions were found to group themselves very largely under the following types:

1. What metal or alloy shall I use for work of such and such a character?
2. What is the best method of making a mixture or of melting an alloy of the following constituents?
3. How shall I gate and vent a casting of such and such a type, and what sort of sand, facings, parting compound, etc., should be used?

These three types comprised a large majority of the questions asked, running from 75 to 90 per cent. Other questions varied widely over all sorts of topics, such as smelting and refining secondary metals, brazing and soldering, advice as to equipment, costs, etc., rolling mill operations, and even such questions as cures for lead and zinc poisoning. Table I and Charts 1, 2 and 3 show statistically and graphically the tendencies of these questions from 1911 to 1921 inclusive.

DEDUCTIONS

Curve 1, on Alloys and Mixtures shows a steady rise from 1911 to 1916, which might be indicative of growing difficulties with this question, but the rise is not great enough to make this certain. It is just as likely to be caused by a normal growth in the use of this service by the readers of the journal. The years 1916 to 1920, however, show a sharp and sustained decrease, while 1921 shows a tremendous rise. Recalling economic conditions,

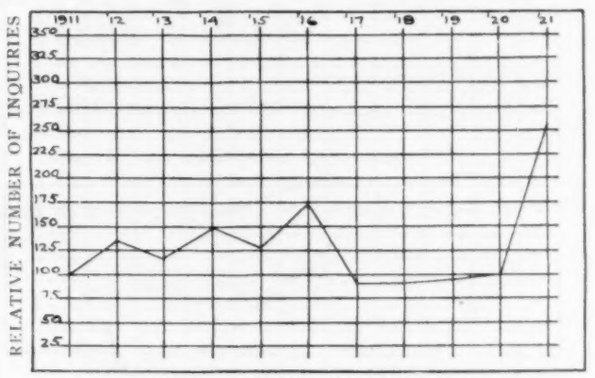


CHART 1.—ALLOYS AND MIXTURES

it will be remembered that 1916 to 1918 was a period of extraordinary activity, when the problem was production of war materials of known standard compositions in increasing quantities, and selling was no problem since the Government took the output.

The period 1918-1920 was also one of great activity, although not on war materials, and the demand was so great that the market was comparatively difficult to satisfy. The year 1921, however, with its great decline in activity and the intense effort necessary to market the product may have stimulated the number of inquiries for better, cheaper and easier-to-handle alloys.

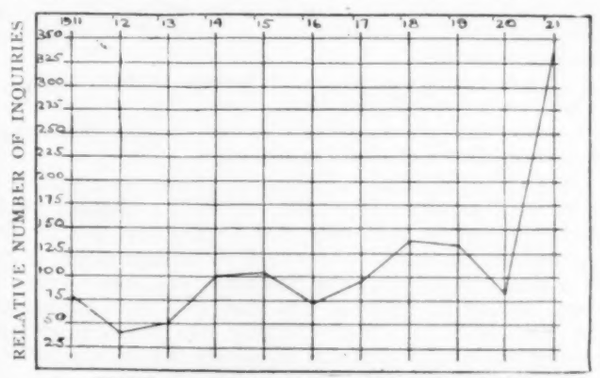


CHART 2.—MIXING, MELTING AND POURING

Curve 2 on Mixing, Melting and Pouring is generally

CLASSIFICATION OF INQUIRIES*

	1911	1912	1913	1914	1915	1916	1917	1918	1919	1920	1921
Alloys and Mixtures	100	133	116	149	127	171	89	89	94	100	259
Mixing, Melting and Pouring	78	39	50	100	105	72	94	138	133	83	331
Molding Methods, Sands, Washes, etc.	83	45	83	67	56	45	72	72	67	88	111
Secondary Metal Recovery	6	11	11	22	28	17	11	28	6	11	39
Brazing and Soldering	17	34	34	34	34	34	28	6	..	17	11
Equipment, Costs, etc.	17	11	6	6	11	..	17	6	11	6	6
Rolling, Annealing, Hardening, etc.	11	17	11	17	22	22	6	11	..	..	11
Miscellaneous	11	6	17	11	..	..	..	..	..	..	22

*The figures in this table do not represent the actual number of inquiries received, but simply the proportional number based on the arbitrary figure of 100 for alloys and mixtures in 1911.

[1] A paper read at the Rochester Meeting of the Institute of Metals Division, A. I. M. E., June 5-9, 1922.

[2] Managing Editor, THE METAL INDUSTRY.

ascending in character from 1911 to the present time, in spite of the two deep troughs. The year 1921 shows a rise as sharp as Curve 1, due probably to the same causes. This would seem to indicate that such difficulties have always been present; that there is no diminution evident over the eleven year period, and that they are, if anything, increasing.

Curve 3 on Molding Methods, Sands, Washes, etc., has remained at about the same level, showing at any rate, no diminution.

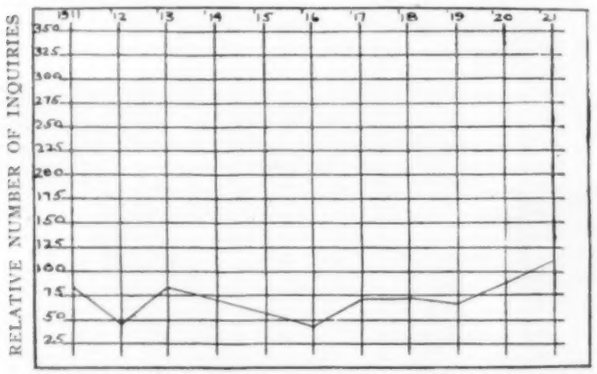


CHART 3.—MOLDING METHODS, SANDS, WASHES, ETC.

It might be inferred from these curves that foundrymen as a whole know no more now than they did in 1911. It must be remembered, however, that many new engineering devices have been developed calling for an increasing variety, and many new alloys and mixtures, causing new and increased difficulties in melting, mixing and casting. To the writer, the latter explanation seems the more plausible, although it must be admitted that a fair percentage of the inquiries that came in during the past year were of the same sort as those which came in ten years before. This would indicate that at least some foundrymen have not progressed.

CONCLUSIONS

A tendency in interpreting charts and figures of this sort, is that too much importance will be attached to seemingly sharp rises and drops. It is also possible that the inquiries received are not a true sample of general conditions. The third danger is that the number of such inquiries is not sufficient to permit, with safety, the formation of correct deductions. All these are admitted by the writer and, it is believed, allowed for. From the three curves shown, it is believed that at least the following conclusions can be safely drawn at the present time.

1. There has been no decrease in the difficulty of choosing the proper alloys for different types of work; if anything there has been an increase.

2. There has been a perceptible increase in the difficulty of mixing, melting and pouring alloys.

3. There has been no decrease in the difficulties encountered in molding, the use of sands, washes, etc.

A feature of some significance is the fact that the number of inquiries from 1911 to 1920 ran about on a level, but that in 1921 they rose to 230 per cent of the ten year average and 260 per cent of the figures for 1920. This rise, coupled with the fact that 1921 was a year of sharp decline in business, and that 1920 was known as the year when the chief difficulty was not selling, but getting out enough material to supply the demand, leads to the surmise that the rise was due, at least in part, to the fact that the market was much more difficult to satisfy as regards the quality and suitability of the materials which it bought.

In view of the foregoing deductions, it is the belief of the writer that a work of real value to the metal trades would be the compilation of a set of authentic standard mixtures for use in metal products. It could be begun by gathering, from existing literature and from metal-using manufacturers and perhaps the Navy Department, data as to the most commonly used mixtures for various purposes. A starting point would be those mixtures which seemed to be favored by the largest number of reliable users It is unlikely that a complete set could be made up in this way, but an excellent foundation would be laid. For those uses where no standards existed, experimental work would have to be done. This is plainly no small undertaking, but one which should be worth while, and in which the technical societies and perhaps the National Research Council and the Bureau of Standards, could very well cooperate.

ECONOMIC NEEDS

In order to obtain additional information on which to base recommendations to the Department of Commerce, questionnaires were sent out to executives in the metal trades asking how the Department could be of service to the industry. Some of the answers were very enlightening. A few are quoted.

The metal trades need:

(1) An authentic record of stocks of raw materials on hand, such as copper, tin, lead, zinc, etc.

(2) Standardization and unification insofar as is possible, of specifications covering engineering materials.

(3) A reduction in the number of specifications by eliminating many that now differ slightly from each other.

(4) Standard cost keeping methods. This would stabilize the jobbing or contract foundries, and not only keep many from bankruptcy due to foolish prices quoted, but also make life pleasanter for those who know their costs and charge accordingly, but must meet the competition of those who do not.

(5) The education of foundrymen and metal manufacturers to use, so far as possible, standard materials for various engineering purposes. This would help to eliminate the vast number of mysterious alloys recommended as "better than anything else" for specific purposes, and would stabilize the metal business.

(6) The publication of statistics of the consumption of metals in various trades and industries.

At the present time production statistics for metals are known, being published by the U. S. Geological Survey, but no one knows accurately for instance, how much copper goes into wire, brass lighting fixtures, valves, hardware, etc.

It is noteworthy that the adoption of recommendations 2, 3, and 5 would help to eliminate the difficulties, charted in curve 1, covering questions of alloys and mixtures. Indirectly, it should also help to alleviate trouble in mixing, melting, pouring and molding, as foundrymen would become familiar with these standard mixtures and their manipulation.

To overcome all foundrymen's troubles is, of course, impossible and to prevent future difficulties is equally impossible—and not even desirable. Many of the difficulties are due to new developments in machines and metals, and these will always cause, for a period at least, a certain amount of disturbance.

DISCUSSION

MR. CLAMER—I should like to ask what method is used by trade and technical journals to answer these inquiries. I have followed them up for a long time and have found that a large number of diverse types of questions have been answered quite satisfactorily.

MR. BREGMAN—Our method is to refer each question to one of a board of associate editors, depending upon the type of the inquiry. Each one of this board is a specialist in his field. Such an arrangement is, of course, necessary since no one man could answer all the different kinds of questions which come up.

THE METAL INDUSTRY

With Which Are Incorporated

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EDITORIAL

THE TARIFF

We have before us two letters, both extremely interesting in the views which they set forth concerning the tariff on tin. Richards & Company of Boston favor a tariff while the United American Metals Corporation of Brooklyn is against it. It is necessary, since the letters are unfortunately too long to publish in full, to abstract them.

The substance of the communication from Richards & Company favoring the tariff is roughly as follows:

Tin smelting is an infant industry and should be protected.

At the present time about 80 per cent of all the tin produced is controlled by foreigners. America controls only 20 per cent but consumes over 40 per cent, leaving us in the power of these outside producers.

There is tin ore in the United States which could be developed under favorable conditions. Foreign producers have in the past and may again place an embargo against tin, thus leaving us stranded.

The tin produced in this country from South American ores is of as good quality as any other.

The added cost to the consumer due to the tariff would be very small because of the small amounts used on each article. The duty of two cents on tin asked for is small compared with the duties placed on lead and zinc.

A tariff would help to break the existing British monopoly in favor of our South American friends and at the same time stimulate the developing of tin mines in the United States and Alaska. The opportunity for profit from tin smelting under a protective tariff will encourage an increase of tin smelting in this country so that the resulting competition will eventually lower the price of tin.

In answer to this, the United American Metals Corporation make the following statements:

The tin industry is a result of war expansion and not truly an industry.

The tin industry is not truly American. It is only partly American and partly South American.

Most of our tin comes from territory controlled by British, Dutch and Chinese governments. The prices at which we purchase tin are no higher than those to British or Dutch or any foreign manufacturer, so we cannot claim a competitive disadvantage.

If a tariff is placed on tin, the South American industry will be built up and smelters will be built near the mines thus leaving the United States with a useless and helpless industry.

There are no tin ores in the United States in commercial paying quantities.

Straits tin is the best tin produced. The example given in particular is that of collapsible tubes in which, it is stated, the use of Straits tin results in fewer defectives as compared with the others.

A duty on tin will destroy American export business in babbitt, solder and other tin bearing alloys.

There is no American tin industry and there can be no American tin industry—hence there should be no duty on pig tin.

Turning from these diametrically opposed viewpoints on tin to the tariff in general, we find more material in a bulletin sent out by the Honorable J. W. Fordney, Chairman of the House Ways and Means Committee. Numerous reasons for a high tariff in general are given. Some of these reasons are, or at least seem to be, sound inasmuch as they point out the difference in wage scales in this country and abroad, and the need for equalizing this condition. However, the tone of the bulletin with its many derogatory references to foreigners, most of whom were our allies in the war, its insinuation that in dealing with them we must be suspicious and watchful, are decidedly unpleasant and in poor taste.

A communication from the Chamber of Commerce of the United States makes the following suggestions:

Creation of a tariff adjustment board to administer adjustable rates.

Reasonable protection for American industries subject to destructive competition from abroad and of benefit to any considerable section of the country.

The principle of maintenance and encouragement of our export trade should be observed in tariff legislation so far as consistent with production of American industries of benefit to any considerable section of the country and subject to destructive competition from abroad.

The present system of valuation for a levy of ad valorem duties should be maintained and the so-called "American valuation" should not be adopted.

This seems to us to be a clear-headed, sane view of the tariff question. No one denies the inexpediency of a very low tariff at the present time, in view of the fact that a large part of our industries, upon which millions are dependent, have been built up by means of the tariff wall. Nevertheless, the carrying of this principle to excess, and the shutting out of all imports can work nothing but harm, especially when it is remembered that between ten and twenty per cent of our production depends on exports for its existence. This proportion, though it may seem small, may make the difference between prosperity and depression.

The fact that the welfare of the nation is so dependent on the tariff makes it imperative to control this instrument by some other method besides political warfare. The business of the country should not be dependent upon the results of an election but should be regulated scientifically in accordance with the needs of the time. The tariff should be based on the necessities of American agriculture, industry and labor. It should be removed from the pressure of political expediencies and special interests. It should be placed in the hands of a commission fortified by advisers from all industries and labor without regard to political affiliations. It is only by such methods that business can be stabilized and prevented from fluctuations between the peaks of booms and troughs of depressions.

METAL INDUSTRIES OF NEW YORK

According to figures obtained from the Merchants' Association of New York from the United States Census Bureau, New York City, maintains its supremacy as the country's leading manufacturing centre. Its manufactured products, according to the 1919 census, equal in value one-twelfth of all manufactured goods made in the United States. New York produces about forty-five per cent more than Chicago and more than two and one-half times as much as Philadelphia, the next in importance.

There are 2,614 establishments engaged in producing or manufacturing metals of all sorts including iron. These establishments use 113,021 persons and turned out products to the value of $435,930,943 in the year noted. Incidentally, these industries are second in size in the city, food products being first with the paper and leather industry about equal though far behind the metal industry. Analyzing the iron and metal industries by dividing them roughly into ferrous and non-ferrous lines, it appears that in those industries which deal only with non-ferrous metals, there are 266 establishments, 7,606 persons engaged and about $40,000,000 worth of products produced, or roughly, ten per cent of the total. Those industries in which non-ferrous metals play only a part have 1,762 establishments, 67,773 persons engaged and produce to a total of about $245,000,000 or about sixty per cent of the total.

It is probably true that the iron and steel industry is much greater than the non-ferrous by about the same proportion as holds good for these industries throughout the whole country. Nevertheless, metals, outside of iron and steel, play an indispensable part in the manufacture of almost all products.

DISTRIBUTION OF WORKERS

Until a comparatively short time ago, it has always been considered axiomatic that we were essentially an agricultural nation. This was undoubtedly true for a long time, but with the coming of high tariff, manufacturing has grown steadily until just before the war, it was within striking distance of agriculture. The war, however, gave a tremendous impetus to manufacturing and now authentic figures show that agriculture is no longer the predominant industry in the United States.

The figures as published by the Census Bureau are as follows:

	PERSONS ENGAGED	PER CENT OF TOTAL
Manufacture	10,882,000	32.9%
Agriculture	9,867,000	29.9%
Trade	3,574,000	10.8%
Transportation	2,852,000	8.6%
Professional	1,136,000	3.4%
Domestic and personal	1,216,000	3.7%
Clerical	1,697,000	5.1%
Mining	1,087,000	3.3%
Public Service	758,000	2.3%

This situation is of more than academic interest. It means that whereas in the past we have been a food exporting and commodity importing nation, we have changed to the extent that we now export both foodstuffs and commodities. Whether or not this will continue until we find it necessary to import food is a question which affects the very foundations of our national life and which we must prepare to meet.

SOCIETY FOR TESTING MATERIALS

The 25th year of the A. S. T. M., marked by the recent meeting in Atlantic City, was an important one. The year showed a gain of 122 members bringing the total up to 3,030. The Executive Committee stated that the outlook was decidedly encouraging and that the Society had passed through a period of financial stringency in excellent condition. The work of the Society has been of increasing importance from year to year, until now, through its formulation of standards and specifications and through its co-operation with other agencies, it is indispensable in the field of engineering materials.

Since its formation in 1898 and its early struggles, its incorporation in 1902, it has been growing steadily. At the present time it has the remarkable record of having one-fourth of its members actively doing committee work.

In his annual address, President C. D. Young stated that he believed the most characteristic feature of the Society to be the independence of its members from preconceived notions, and arbitrary standards. The secret of the success of the standards of the society has been the fact that before adoption, they have been so thoroughly criticised and revised as to be acceptable to everybody interested and to command unanimous approval. On the other hand objections on the ground that adoption of a certain standard would prevent a manufacturer from marketing a special article or an engineer from profiting by a special design have seldom been supported by the membership at large.

The proof of the strength of the A. S. T. M. is the large number of important organizations with which it has been asked to co-operate. Among these are American Society of Mechanical Engineers; American Society of Civil Engineers; American Institute of Electrical Engineers; American Engineering Standards Committee; U. S. Department of Commerce; American Electric Railway Association; American Railway Association, and it is hoped during the next year to broaden this co-operative work still further.

Dr. Burgess, president of the Society for the coming year, has laid out a program of work with the Federal Specifications Board, the American Engineering Standards Committee and organizations abroad which will carry the Society further than ever before.

THE PLATERS' CONVENTION

A glance through the report of the convention of the American Electro-platers' Society recently held in Cincinnati, O., shows that it was fully up to the standard in educational value and interest. It is always unnecessary to state that the entertainment was of the highest order. It always is. To the new officers we tender our heartiest congratulations and good wishes. We know that they will maintain the rate of progress set by the old officers.

The next convention will be held in Providence—a New England convention.

CORRESPONDENCE and DISCUSSION

Although we cordially invite criticisms and expressions of opinion in these columns, THE METAL INDUSTRY assumes no responsibility for statements made therein.

CUTTING THE COST OF BRASS GOODS

To the Editor of THE METAL INDUSTRY:

The foremost question in manufacturing today is cost-cutting. "Prices must be reduced."

In the majority of cases the secret of making price reductions to meet the present business conditions is not so much in reducing shop costs as in the reducing the cost of the red tape or non-productive expenses. Efficiency engineers are all right in their way but it is a fact that they have a pet idea of reducing everything to a detail and they lose their sense of perspective entirely.

I have seen a large brass manufacturing concern hit and hit badly by this system bug and if the truth were known some manufacturers have gone into the hands of the receiver as a result.

We all know that it is required of a new tool or device that it combine better work and lower cost of production for it to be successful. If it does not qualify the first tool may as well be kept in use. Where you see a shop with a multitude of high salaried officials and innumerable clerks carrying a high overhead of non-producers, the sooner they can get back to the simpler methods of conducting their manufacturing operations which will enable them to reduce costs, the better. Another economy which firms can adopt is confining or specializing in certain lines of goods and manufacturing these lines in as large quantities and as few sizes as possible.

Another cost-saving idea is manufacturing a complete article in one department. When an article is made in one department which is in charge of a capable foreman who is solely responsible for everything from machining the rough castings to the assembled product a number of economies can be accomplished. A closer interest is taken in the product by the employee as he knows the accuracy of his work depends on the assembling of the completed job and if there is trouble and time lost assembling he can overcome it and cut down time consumed unnecessarily.

If the goods are moved away and parts stored into another department he does not know the trouble that has developed. Another economy is the elimination of the heavy expense of new designs, patterns, jigs, and fixtures for goods on which sales per year are at a minimum and in which invested capital in equipment is idle 90 per cent of the time.

In cases where the different operations on an article are scattered through about ten different departments it means that ten different foremen are needed with a clerk to each foreman. If some of the brass manufacturers who are struggling in the throes of this present cost reduction will follow on the lines laid down in this short article there would be less need for drastic wage reductions (and the consequent friction) which seems to be the first thought when contemplating a lowering of selling prices.

P. W. BLAIR.

Montreal, Canada,
July 1, 1922.

PHOSPHOR COPPER PRICES

To the Editor of THE METAL INDUSTRY:

In your current issue (June) and under Metal Prices, June 12, 1922, you quote:—"Phosphor Copper, guaranteed 15%, according to quantity, 17c. to 26c." May we ask on what information the minimum price is based? So far as we have been able to learn, 15% phosphor copper has not been offered, during June, at 17c. in any quantity. And if a lot may have been sold at that figure, the price could not have been representative. You can figure this out yourself.

On page 51 of the same issue, you give the price of copper at 13¾c. to 14c. per lb. Taking 85% of copper at 14c. (the price that spot copper brought the first two weeks of June), the copper content costs $11.90; add the cost of 15% phosphorus at 25c. per lb. and this ingredient would figure $3.75. This makes a total of $15.65 as the cost of ingredients, leaving $1.35 for fuel, crucible cost, labor, packing, overhead and profit. You can readily see that before the "profit" item is reached, the 17c. mark will have been passed.

There is a possibility that by using scrap crucible copper, which would have cost during this period about 13c., the manufacturer would come out nearly even, but at that the chances are that 17c. would not cover him.

Then, another phase should be considered: phosphor copper made from scrap is concededly not as good an alloy as any made from virgin metal. A quotation should therefore read:—"according to quality and quantity."

We believe that we are the largest manufacturers of phosphor copper in the country. As a matter of business policy we keep posted on prices quoted by other manufacturers. On one or two occasions during this month we had read that 17c. was quoted but we could not verify it. Our experience has taught us that in most cases where prices are said to be quoted which prove to be under cost, the supposed sales were either non-existent or were ex-contract based on a previous low market.

UNITED AMERICAN METALS CORP'N.

Brooklyn, N. Y.,
June 17, 1922.

METAL FINISHING WHEELS

To the Editor of THE METAL INDUSTRY:

On page 197 of the May issue is noticed a heading "New Metal Finishing Wheel." It is not new. This wheel was on the market over thirty years ago when the writer started business and has been manufactured ever since continually by a man employed most of that time in the Remington Typewriter Company with whom the writer is well acquainted. His name is Mr. Schesch.

Wheels of this form in general, that is to say, consisting of a wood center with leather on edge, crosswise and radial, held onto the wood center by means of tacks, glue, nails, etc., have been on the market for many years and to the writer's knowledge have been manufactured by several parties in different parts of the country, as well as by various manufacturers for their own use.

This wheel was not invented, developed and perfected because of the inability of the Henry Cheney Hammer Company to secure satisfactory wheels. We have no grudge against this form of wheel. We realize its abilities and its limitations. We have been asked to take up the manufacture of it a number of times by different so-called inventors of wheels of this type. The disadvantage of this type of wheel is the very fact that the density cannot be varied to suit different conditions in different phases of polishing work. The question of safety in a wheel of this sort under rough working conditions has been against this type of wheel. The fact that the segments are glued to one another in itself confines the density within very narrow limits. The statement is made that "each segment is tapered before being inserted to insure a perfect fit and not in any way forced by compression." Now here is a curious thing—wheels of this type have been on the market for many years before the so-called compress polishing wheel was invented and all such old wheels lack the feature that has made that compress polishing wheel a standard tool in metal finishing work the world over. The process of compression is the one thing that was needed in the polishing industry to permit the structure of polishing wheels of the many densities required to suit the delicacy of human touch in doing fine polishing work.

Without any desire to knock the Henry Cheney Hammer Company, who have been good customers of ours as well as neighbors, we do not think that the Trade should be permitted to think that a wheel of this sort is something new when in fact it is so old and had it any particular merit, it would have been better known throughout the Trade than it is today.

Utica, N. Y. B. H. DIVINE, Member A. S. M. E.
May 15, 1922.

ZELLER LACQUER COMPANY

To the Editor of THE METAL INDUSTRY:

There have been many rumors circulated among the trade during recent weeks to the effect that the Zeller Lacquer Manufacturing Company were interested in one way or another with another company manufacturing the same type of products. Mr. Hugo Zeller wishes it to be understood that there is now absolutely no connections, either financially, personally, or otherwise, between any individual now in the Zeller organization and any other lacquer manufacturing company.

It will be remembered that the Zellers at one time were actively and financially interested in the Egyptian Lacquer Mfg. Company, Dr. Gustavo Zeller being its founder, but since the Zeller Lacquer Manufacturing Company was formed by the Zellers and other executives of the Egyptian organization, they have sold out their interest complete so that, today, there is positively no connection whatsoever between the two concerns.

ZELLER LACQUER MANUFACTURING COMPANY.

New York, June 15, 1922.

ALUMINUM IN BRASS

To the Editor of THE METAL INDUSTRY:

In looking over a copy of THE METAL INDUSTRY under Plumbers Supply Mixture, we note the reply says "Aluminum" will remedy, etc., but you go on to state that it is not a remedy at all.

Allow us to suggest that you correct all replies to warn against use of aluminum in brass as it causes leakage when present in minute quantity and while some will use it, the fact remains that when any scrap is used the aluminum therein will cause trouble. Aluminum should not be used in brass mixtures if possible to avoid.

Sincerely yours,

THE EDRO RICHARDSON BRASS CO.

Baltimore, Md., June 18, 1922.

We have always felt the same way on the subject, and even when we recommend aluminum as a deoxidizer, we warn the inquirer that it is a difficult material to use.—Ed.

CASTING GOLD IN SAND

To the Editor of THE METAL INDUSTRY:

I would correct your positive statement regarding the difficulty of using Sand for Casting Gold, in Problem 3,059, Page 155, April, 1922.

We have used a Sand Casting outfit for gold which far surpasses the cuttle fish every way.

The materials, specially prepared sand, flasks, tamps, etc., complete for the purpose, are made and sold by Fred H. Curl, Locust street, Des Moines, Iowa, and it is perfectly reliable and does fine work.

The sand can be used over and over.

I don't know whether it is used in N. Y., but out West it is highly regarded, and saves the high cost and waste of fish bone.

Chicago, Ill., CHAS. A. WINSHIP.

June 12, 1921.

NEW BOOKS

Metalltechnischer Kalendar, 1922, edited by Dr. W. Guertler. Published by Gebrüder Borntraeger, Berlin, Germany.

This little metallurgical almanac and its contents are devoted to the dissemination of technical information about the useful elementary metals, their binary alloys and also a number of their ternary alloys.

It contains a great deal of data usually found in chemical or metallurgical hand-books and in addition the latest information obtainable about the physical properties of various metals and their alloys. It contains a very interesting grouping of the metallic elements according to the periodic system and shows how the study of this system may be applied in combining them and points the way to new discoveries.

The second chapter of this tiny booklet is so interesting that I have made a transcript of the main portion of it so that my readers may get a fair conception of the practical basis upon which the publication has been undertaken.

In practice almost all alloys are produced by simply melting their constituents together. Such a method of course is not always possible. There are metals which run together in the molten state like oil and water, without generally dissolving noticeable quantities of one another; thus nickel and silver and in turn there are others, which dissolve one another to but a limited extent, such as ether and water, or lead and copper. Beyond the limits of miscibility, alloys can not be produced by the simple scheme of melting them together. They have a greater tendency to separate in layers from one another the greater the difference of their specific gravities is of both of the additions.

With other mixtures, to be sure there is miscibility, but the melting points can be very different or even the melting point of one constituent may be higher than the boiling point of the other.

To overcome such a difficulty the melter makes a diagram of the boiling and the melting points of the various metals from some reliable source and governs his procedure by the facts plotted on his diagram. Also if this difficulty does not exist, it is known that one metal dissolves in another more or less sluggishly or lively. In general the process is so much the more lively the further apart the metals are in the periodical system (which really adduces another good reason for making an intensive study of the possibilities of the periodic system).

The little book is only 4" by 6" by about ½" thick, it contains 134 pages of good clear type on thin book paper of good quality and bound in boards covered with black cloth. The front of the book is ornamented by a black devil peeking into an orange red flaming furnace as if looking for what was left to him of the spoils of the late disastrous war. The importing price is stated to be 45 marks, but what that amounts to translated into the hard and hold-fast coin of the U. S. of A. no mortal man can say.—R. E. SEARCH.

TECHNICAL PUBLICATIONS

Weighing by Substitution, by C. A. Briggs, and E. D. Gordon, of the Bureau of Standards, published by the Bureau of Standards as Technologic Paper No. 208.

This paper describes a plan for making accurate substitution weighings, applicable either to equal arm balances or compound lever scales, that has been developed in connection with the standardization of large weights at the Bureau of Standards. It has been prepared to meet a demand for an explanation of substitution weighing which has come from practical scale men in the field who have seen the plan in use by the representatives of the Bureau and who desire to adopt it. The description, however, will also be of interest and value to many workers in engineering and other laboratories who have occasion to weigh large objects accurately. A record form and computation sheet is presented which it will be found advantageous to follow.

The Fatigue of Metals.—A report of research, published in the annual report of the Engineering Foundation, 29 West 39th Street, New York, for the year ended February 9, 1922.

Work under the agreement of Engineering Foundation with National Research Council and the University of Illinois on the investigation of the fatigue phenomenon of metals was completed in November and a full report printed in December as Bulletin 124 of the Engineering Experiment Station of the University of Illinois. An abridged report forms a chapter in the annual report of the Foundation.

Important additions have been made to our knowledge of the nature of fatigue, or progressive failures of metal and of the endurance limits of certain metals under repeated and reversed stresses. The General Electric Company is contributing $30,000 for an extension of the research along lines of special interest to it; this may extend through another year. Other industrial corporations have expressed interest, but business conditions have prevented them from taking advantage at low cost of this unusual opportunity for experimental work connected with their materials or products.

GOVERNMENT PUBLICATIONS

Copper in 1920, by H. A. C. Jenison, U. S. G. S., Washington, D. C.

Fuel Briquets in 1921, by W. F McKenney, U. S. G. S., Washington, D. C.

SHOP PROBLEMS

IN THIS DEPARTMENT WE ANSWER QUESTIONS RELATING TO SHOP PRACTICE

ASSOCIATE EDITORS { JESSE L. JONES, Metallurgical; WILLIAM J. REARDON, Foundry; PETER W. BLAIR, Mechanical; LOUIS J. KROM, Rolling Mill; CHARLES H. PROCTOR, Plating-Chemical; R. E. SEARCH, Exchange-Research }

ANTIMONY POISONING

Q.—It has occurred to us that you might be able to give us some advice regarding a treatment for metal poisoning. One of our valuable men handles pewter most of the time and his hands become dry and crack open, becoming very sore and painful. He is a very large man and has light complexion which may account for it. He has been troubled now for about a year and has used many different salves, which relieve him as long as he doesn't handle the metal.

A.—It is possible that your employee whom you refer to is very susceptible to lead and antimony poisoning which come from handling these metals, which get into the skin, causing the painful sores.

Similar results are frequently caused by coming in contact with nickel solutions. Many men suffer from nickel poisoning.

We would suggest that a trial be made of the remedy formulated by Charles H. Proctor for Cyanide Poisoning and Nickel Itch, on page 187, May, 1921 issue of THE METAL INDUSTRY. The Rochelle salts prescribed as a laxative may be increased to one teaspoonful instead of the one-fourth mentioned, for at least two weeks.

Let us know the results obtained.—C. H. P. Problem 3,095.

BRASS BIB COCKS

Q.—We are manufacturing brass bib cocks. We use brass sheet scrap adding 6¼% zinc before pouring. We make these cocks by oil casting, i. e., we cast them in sand mixed with red tar. But these cocks when machined and subjected to a pressure of 150 lbs., we have to reject 25% of them on account of leakage, due to very minute pours in their bodies.

So kindly let us know: (1) Wherein lies our fault, whether in our mixture of the metal or in our method of molding; (2) If it is in our metal mixture, kindly suggest a new formula, which should not however increase our cost, and (3) If the fault is in molding, what correction would you suggest.

A.—We are of the opinion that the cause of your trouble is the metal, as brass sheet scrap is not a good sand-casting metal to stand a pressure of 150 pounds. We suggest that you try adding 6½ pounds of lead and 2% tin to your mixture, and adding 0.25% of 15% phosphor copper a few minutes before the metal is poured. It is also necessary to avoid leakage due to the absorbing of gases in the metal, to use charcoal for cover on the metal or tree bark with a little common salt in the melting. This is the best preventative of leakage when the right metal is used.—W. J. R. Problem 3,096.

BRONZE BEARINGS

Q.—We have been experiencing quite a bit of difficulty in various bronze bearings, more so in our bearings that weigh ten pounds and over than the smaller ones. They seem to come pitty after the skin is cut and then being machined down approximately 3/16 the bearing is again clean.

We have been using Sandusky Sand, Sharp Sand, Burnt Core Sand and Core Oil, Linseed Oil, Dextrine and Rosin for a binder but they all seem to come the same.

Kindly let us know of a mixture for various size bearings from 1 to 200 pounds. How many parts of various sands to parts of binder, also which is the best for bronze work.

A.—We are of the opinion that the trouble you describe having with various bronze bearings ranging in weights from 10 pounds to 200 pounds is not altogether in the mixture of the core sand you are using. It looks as if the trouble were with the composition of the metal you are using. Very often such difficulty is found in bearings, in the mixture of which an excess of lead is used. The addition of lead to certain alloys of copper and tin will cause porosity next to the core. Under certain conditions one difficulty is adding the lead to very hot metal which causes the lead to oxidize and give off the vapors that attack the crucible. If you will use a mixture of the following you will find no difficulty in melting.

80 copper
10 tin
10 lead
1.0 to 2.5 phos. copper

We would suggest that in preparing your alloy, that you melt the copper, then add the tin, then the phosphor copper, then the lead. It is advisable also to use a flux. A number of these fluxes are on the market. If not available, use a handful of lime.

For bushing core, 1 pound to 200 pounds, use 4 parts sharp sand, 2 parts old sand, 2 parts molding sand and 1 part dextrine to 50 parts sand. Use Bull Run talc as a wash where there is considerable metal around the core. Rub the core with a mixture of gasoline and talc.

A good method in mixing a wash for cores is to apply a small amount of air to the barrel of wash to agitate by running a small air pipe to the bottom of the barrel. This will keep the mixture well mixed.

In mixing core sand it is important to mix it well, preferably in a mixing machine, of which there are many on the market. A mixture of 76 copper, 15 lead, 7 tin and 2 of 15% phosphor copper can be used with good results. Beyond 15% lead nothing is assured.

When dry sand cores are used in high lead mixtures there seems to be more difficulty than when green sand cores are used. If there is any inefficiency in melting it will show a dirty spongy surface next to the dry sand core until 3/16 of the surface is removed after which it appears clean again. Some people add sufficient stock to take care of this difficulty. A green sand core will not show nearly as bad as dry sand cores. A good mixture for dry sand cores for such work consists of the following:

4 parts sharp sand
1 part old sand
1 part molding sand

For binders use 1 part core oil to 80 parts sand, and 1 part dextrine to 60 parts sand.—W. J. R. Problem 3,097.

ANTIMONY IN COMPOSITION MIXTURE

Q.—We are making some brass castings for small house pumps and at the present time are using 85-5-5-5 mixture. Our people claim that the mixture is too hard and retards production. Kindly let us know if with a higher amount of antimony, no tin these castings would machine easier. None of the castings have a very hard usage or under extreme pressure.

A.—Antimony is said to be detrimental to brass where any pressure is concerned, but people making steam or air work shun antimony as it is as bad as aluminum. We would suggest that you use 83 copper, 10 zinc, 5 lead and 2 tin, or 73 copper, 7 lead, 18 zinc and 2 tin. These mixtures are used for rapid production in machine shops and also for pressure.—W. J. R. Problem 3,098.

COLORING COMPOSITION CASTINGS

Q.—Please advise us if there is not some sort of powder or similar substance that would help to make composition castings a darker red, after machining. We have composition castings but no matter how much copper we add to it, it appears a pale copper color. We cannot add too much copper as it won't be fit for machining.

A.—There is an old wash method of coppering brass, used a number of years ago. We would suggest that you try it for coloring your castings a copper color.

Water	1 gallon
Copper Sulphate	2 ounces
Sulphuric Acid	66% 1 ounce

The castings should be clean and free from dirt or grease. They should be dipped in this mixture and then washed in cold running water, then dipped in hot water and drained to free from excess water, and dried in maple wood sawdust.—W. J. R. Problem 3,099.

DISSOLVING CRYSTALLIZED BORACIC ACID

Q.—Please let us know how to dissolve crystal boracic acid. We cooked it for four hours but it does not dissolve. We use the boracic acid and table salt for brightening the color and as a conductor. We would like to have you inform us if this is the proper ingredient used for the purpose mentioned.

A.—The best method to pursue in dissolving crystallized boracic acid is to use boiling hot water maintained at 212 deg. Fahr.

Add just as much of the boracic acid to the boiling water as will be dissolved, then add to your nickel solution.

If the boracic acid solution is allowed to cool to normal temperature, it will recrystallize to its original salt.

A very good method is to dissolve single nickel salts and boracic acid together.

Common salt and sal ammoniac are reducing and conducting factors. They are not brighteners.

Epsom salts, which is a magnesium sulphate, is a brightener. Very minute amounts of gum arabic dissolved in boiling water, as well as cadmium chloride are excellent brighteners. However, less than one grain per gallon should be used. Repeat at intervals.

The solution should be agitated by air. Two volts should give a good deposit at 10 amperes per square foot of surface.—C. H. P. Problem 3,100.

POLISHED ALUMINUM PLATES

Q.—We have a quantity of flat aluminum plates to cast which have to be polished. Our customer wishes these to take a high polish. Will you please advise us of a good mixture out of which to cast these; also the method for polishing; whether a wheel or a belt and whether they should be ground smooth, the same as brass; also the kind of grinding compound to use, such as Tripoli or Rouge.

A.—In polishing aluminum castings the same procedure must be followed as in polishing brass castings of similar shape.

Wooden wheels, leather covered, and coated with glue and 100 emery, should be used for roughing out. This should be followed by a similar operation, using 160-180 emery; or emery-paste and tampico-wheel brushing may be satisfactory.

After the second operation cut down with tripoli, using the regular type of muslin buff for the purpose. A little kerosene oil should be applied to the buff to keep the wheel from glazing over with the aluminum.

The plates should now be washed thoroughly in benzine or gasoline to remove the tripoli. Then dry out in hardwood sawdust, preferably in maple or birch.

Finally color to a high lustre with a regular coloring buff. These operations should give the desired surface and lustre. Any of the firms dealing in plater's supplies, advertising in the METAL INDUSTRY can furnish the materials as outlined.—C. H. P. Problem 3,101.

RECOVERING SILVER

Q.—How can I recover silver from cyanide solutions used in "backing off" silver from brass articles. This solution contains about 10 ounces cyanide and a little caustic soda per gallon.

A.—If your silver solution is of small volume you can deposit out the silver by using steel for the anode and a thin piece of sheet steel as the cathode, making it as large as possible.

A little free cyanide will have to be added to the solution until all the silver is deposited. Do not use too high a voltage and current, as the silver will be coarse and granular. After the silver is all deposited out it can be melted from the steel, or the steel coated with the silver can be used as anodes in a regular silver solution, until all the silver is reduced.

If you do not want to deposit the silver out, then you can precipitate the silver out of the solution with zinc dust or zinc shavings. Keep adding a little at a time of either material until all the silver is deposited.

Filter off the precipitated silver and zinc, and wash thoroughly. Then dissolve the zinc with muriatic acid. The silver will be found as silver spangles. These can be recovered and remelted, as desired, with sodium carbonate and a little powdered charcoal. —C. H. P. Problem 3,102.

RESILVERING MIRRORS

Q.—I resilver mirrors, using nitrate of silver, 35 drams; potassium sodium tartrate, 25 drams. I have been successful until two weeks ago, when the work began to come mottled. Can you send me a formula?

A.—If you have had successful results in silvering mirrors by the aid of a combination of solutions prepared from 35 drams nitrate of silver and 25 drams of potassium sodium tartrate, then there is no reason why you cannot duplicate the results, presuming the silver nitrate and potassium sodium tartrate are reasonably free from impurities. The combination is one commonly used by silverers of glass mirrors.

You might try the following solution. It is not necessary for us to give you details of manipulation, since you are familiar with them.

Solution "A" is prepared as follows:

Distilled water	5 ounces
Nitrate of silver	1 "

When the silver is completely dissolved add aqua ammonia until the brown precipitate of oxide of silver which is formed is just redissolved. Now add more distilled water to make up 100 ounces.

Solution B.

Distilled water	20 fluid ounces
Grape sugar	2 ounces
Rochelle salts	2 "

Dissolve ½ ounce of nitrate of silver in 2 ounces of water and then mix with the above. It is claimed that the solution so prepared should be boiled for half an hour, replacing the water lost by evaporation.

For use the solutions should be mixed in the ratio given, about 5 of "A" to one of "B."—C. H. P. Problem 3,103.

SETTING A GENERATOR

Q.—We have a dynamo built by the Rochester Electric Motor Co.; shunt wound for continuous duty, No. 6184. Volts 3 & 6 Amp. 150 and 300 motor drives.

The vibration of the building which is caused by heavy grinding machines, fans and pumps in the adjoining room, which is the polishing dept., affect the dynamo and keep the brushes in a continuous chatter. We have this dynamo mounted in a hollow base or frame setting flat upon the floor, and is 16 inches wide by 45 inches long with one quarter inch moulding or edging. How can this be overcome?

A.—Regarding the trouble about the vibration of polishing and other machinery causing the brushes to chatter on their generator, we believe that the simplest way would be to move the generator to a point over one of the large cement beams in the building, because it is quite probable that in its present location it is part way between the natural supports of the building, and this allows it to vibrate. If this is not practical on account its being in the way, the next best remedy would be to suspend the machines by a bracket or solid platform, bolted or clamped to one of the large posts of the building. A platform could be arranged with proper braces for a small amount of money, which would place the machine in a position where it would not be effected by other machinery on the floor.

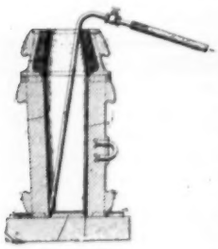
The next best means would be to tighten up the tension on the brushes so that the vibration would not affect the contact of the brush with the commutator. If you tighten up the brushes, it might be necessary to have brushes of a little harder material, so that they would not wear away too rapidly.—C. G. B. Problem 3,104.

PATENTS

A REVIEW OF CURRENT PATENTS OF INTEREST

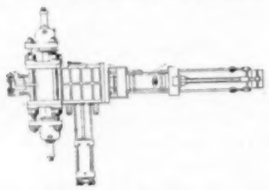
1,409,040. March 7, 1922. **Making Ingots.** George E. Thackray, of Westmont Borough, Pa.

This invention relates to improvements in making ingots with special reference to producing an ingot free from fins or projections on its lower portion in order to prevent shrinkage strains and cracks while cooling, and while this is adapted to various forms of ingots, it is especially useful with ingots of the type having their larger ends upward, which are thus made in order to concentrate the piping or shrinkage cavities in the upper portion within the refractory material or lining of the sink-head top which may be used in this connection.



1,409,726. March 14, 1922. **Scrap-Metal Press.** Emanuel Kardos, of Newark, N. J., assignor to Metal and Thermit Corporation of Chrome, N. J., a corporation of New Jersey.

One object of the invention is to provide a novel arrangement of rams which will produce the required compression of the scrap metal without placing excessive strain on the walls of the compressing chamber. Another object is to provide a press in which the friction of the compressed material against the sliding discharge door will be relieved as soon as said door starts on its opening movement. A further object is to provide a press in which the blocks of compressed metal will drop by gravity from the machine, rather than requiring an additional ram for their ejection.

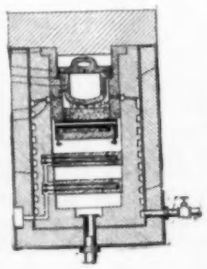


1,410,499. March 21, 1922. **Metal and Its Manufacture.** Aladar Pacz, of Cleveland, Ohio, assignor to General Electric Company, a corporation of New York.

The process of producing substantially non-sagging and non-offsetting tungsten filaments, which includes intimately associating finely divided tungsten and a material which volatilizes mainly at temperatures within the range of rapid grain growth of the tungsten and thereafter sintering the tungsten into a coherent body.

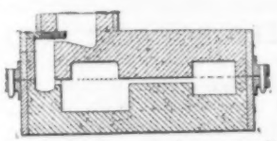
1,410,566. March 28, 1922. **Electric Furnace.** William S. Hadaway, Jr., of New Rochelle, N. Y.

This invention relates to improvements in electric furnaces and especially to a new type of apparatus for obtaining high temperatures at low cost. One object of the invention is to provide a simple apparatus for supporting combustion wherein the temperature of admitted vapor is raised above the ignition point of the fuel by electrical energy. Another object is to provide an automatic means for controlling the electrical energy for the heaters. A still further object is to provide means for admitting air to the combustion chamber where it may be combined with the flame and increase the efficiency of the apparatus.



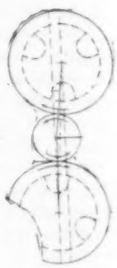
1,410,775. March 28, 1922. **Mold for Metal Casting.** Frank E. Thomes, of Portland, Maine.

A sand mold for making metal castings including a matrix having its upper surfaces imperforate, a feeding chamber adjacent thereto and communicating laterally therewith, a pouring basin communicating with said feeding chamber, a skim gate interposed between said pouring basin and said feeding chamber, said feeding chamber being of sufficient size to keep the casting supplied with metal during its cooling and contracting and extending above the level of the highest portion of the matrix whereby a constant fluid pressure is exerted on the upper inner surface of the matrix by the pressure of the contents of the said feeding chamber.



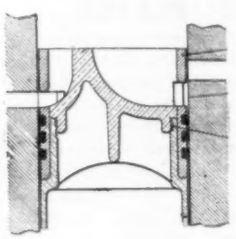
1,411,583. April 4, 1922. **Rolling-Mill.** James M. Perry, of Detroit, Mich., assignor to himself and Albert B. Hanson, of Detroit, Mich.

In a plate mill of the three-high type and wherein the lower roll is the driving roll, means for supporting the rolls in a manner to locate the axes of the upper and intermediate rolls in rear of a vertical plane extending through the driving roll axis and with the axis of the intermediate roll forward relative to the strain line of the rolls.



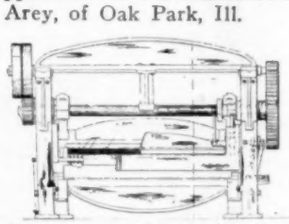
1,410,776. March 28, 1922. **Piston for Internal-Combustion, Engines.** Louis Victor Thomas, of Lyon, France, assignor to La Société Anonyme du Moteur L. Thomas, of Lyon, France.

In an internal combustion engine piston the combination of a cylindrical piston body of light metal externally reduced in diameter at its upper part, a piston head of light metal screwed into the upper part of said cylindrical body, a gas deflector on said piston head, integral therewith, and a steel sleeve fitted upon the reduced upper part of said body, said sleeve extending upwardly around said piston head and said deflector and having ports.



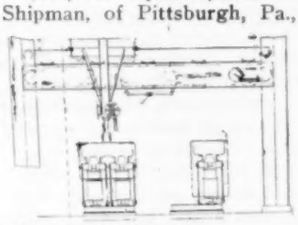
1,412,156. April 11, 1922. **Apparatus for the Manufacture of Expanded Metal.** Fred. C. Arey, of Oak Park, Ill.

This invention relates to apparatus for the manufacture of expanded metal lath and other articles, more particularly by expanding the metal in a direction perpendicular to one of the edges of the sheet as distinguished from those processes wherein the metal is expanded diagonally to one side of the sheet. It is an object of the invention to provide a simple, readily operated machine for expanding metal sheets. It is also an object of the invention to provide a machine which will operate on a wide sheet of material and cut the same off whenever desired.



1,412,066. April 11, 1922. **Welding Apparatus.** William P. Shipman, of Pittsburgh, Pa., assignor to Blaw-Knox Company of Hoboken, Pa.

This invention has relation to welding apparatus, and more particularly to apparatus which has been especially designed for use in the manufacture of large sheet metal vessels or receptacles, such as annealing boxes and the like. The object of the invention is to provide apparatus of this character by means of which the work can be rapidly and thoroughly done, and in which the amount of manual labor required is reduced to a minimum.



EQUIPMENT

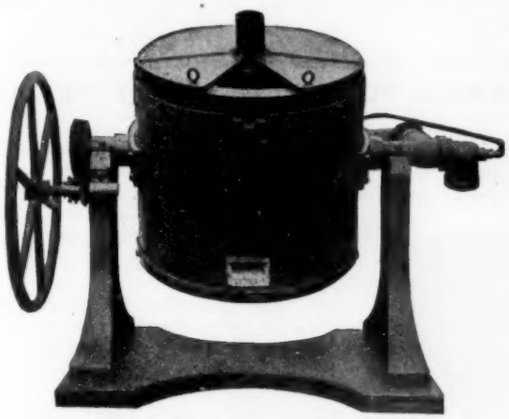
NEW AND USEFUL DEVICES, MACHINERY AND SUPPLIES OF INTEREST

Monarch Furnaces

The Monarch Engineering and Mfg. Company of Baltimore, announces that it has placed on the market, a number of new types of furnaces which have remarkable properties. Among them are the aluminum melting furnace; the stationary or tilting furnace; the Monometer or soft metal melting furnace, and the stationary reverberatory furnace for melting white metal drosses.

ALUMINUM FURNACE

This furnace is of the iron pot type with improved design which is said to keep both the top and bottom of the charge almost equal in temperature. The heat is applied at the bottom, passes around the pot and up through annular spaces. A cover

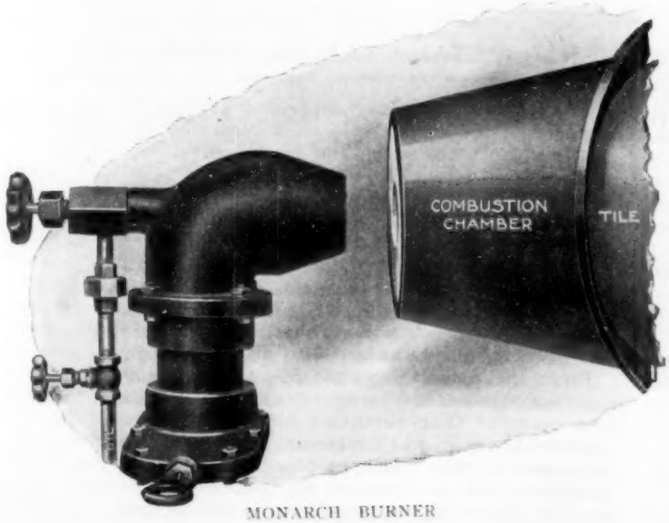


MONARCH ALUMINUM FURNACE

on the top forces the spent gases to act as a complete blanket before they can emerge through an opening in the centre. A slide door is placed in this top cover to permit charging and discharging. If oil is used, air pressure necessary is 8 ozs., oil pressure 5 lbs. If gas is used, air pressure is 4 ozs., gas pressure 2 inches. These pots are made in sizes up to 500 pounds capacity.

TILTING AND STATIONARY CRUCIBLE FURNACES

Improved designs are said to have been incorporated in these types of furnaces. A new type of burner using oil at 5 pounds and air at from 6 ounces to 5 pounds is installed. The heat is admitted tangentially, thus forcing the flame to circulate about the pot, instead of striking it directly.

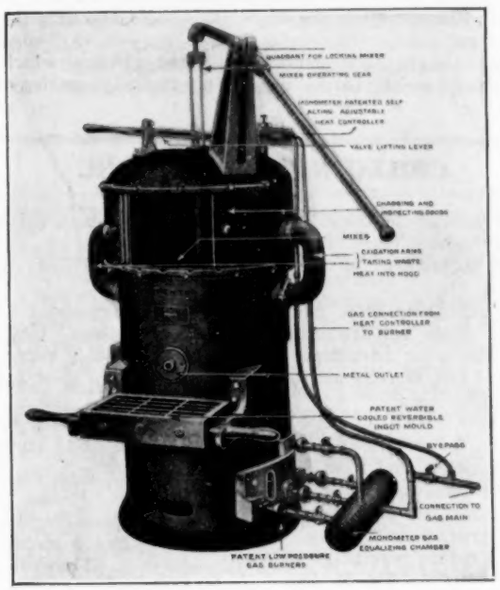


MONARCH BURNER

MONOMETER

The Monometer is a soft metal melting furnace with the following advantages claimed for it:

Automatic control of heat to prevent burning of metal or formation of dross, and to effect a saving in gas which this furnace is designed to use as a fuel.



MONOMETER

New and improved low pressure Bunsen burners without air blast.

Anti-oxidation system which encloses the surface of the metal in a non-oxidizing atmosphere, thus forming practically no dross.

Ingot mold included for speedy casting. The ingot mold is water cooled and double sided, of the Tipler type.

The mixer is an integral part of the furnace, of the lever operated type, which thoroughly mixes the alloy and ensures a homogeneous cast ingot.

Average melting, with gas at 500 B. T. U.'s capacity, takes 45.2 cu. ft. per 100 lbs. of metal melted.

This furnace is built in standard sizes of 400 lbs., 900 lbs., and 2,000 lbs. Special sizes can be obtained up to 10 tons capacity.

REVERBERATORY FURNACE

The Monarch Engineering Company, Baltimore, Neb., has put into operation for testing purposes, an improved oil fired reverberatory furnace, which has, it is stated, gone beyond their own expectations. They state that they have now in this furnace, as near perfect combustion as possible, as the whole furnace is at a uniform incandescent heat, a white heat being obtained from a cold furnace, within forty-five minutes.

In the table below are the results of one small heat carried out in reducing the oxides, which had already been once treated, obtaining all the free metal possible; in other words, material treated was an oxidized lead, and antimony from the alloy.

The "Test Sheet" is just a memorandum of the beginning of the series of experiment being carried out.

TEST SHEET.

Practical test on type metal dross, in works of M. E. & M. Company, operating with a five hundred pounds capacity reverberatory furnace, oil fired, fitted with special new combustion chamber arrangement (size of bath 40 in. x 19½ in).

Furnace charged hot at 3.45 P. M. Dross Charged 100 pounds, with 10 pounds of saw dust.

Oil turned off, at 5.00 P. M., and fluxed with small amount of soft coal, and lime.

Amount of metal recovered 41 pounds.

Reheated and tapped again at 5.15 P. M. further 5 pounds of metal recovered.

Total metal recovered 46 pounds.

Net weight of ash, and slag recovered 27 pounds.

No doubt that fifty percent recovery can be guaranteed, as with a new furnace some part of the metal is absorbed by small spaces within the brick (this does not happen after first charge).

Approximate oil consumption, eight gallons, which can be reduced owing to the further operation, requiring much less time.

COILED NICKELIZED ZINC

The American Nickeloid Company, of Peru, Illinois, announces that after several years of experimental work it has just recently perfected a process for the manufacture of nickelized zinc in coil form.

For many years there has been a constant demand for such a metal, from manufacturers of metal stampings, etc., who realized the great advantages to be obtained if only they could buy nickel zinc in coils and feed automatically into their presses, instead of by hand.

They have called the metal Ribbonoid and are prepared to furnish same in continuous lengths of 175 to 525 feet, depending on the thickness and from ¼" up to 12" in width.

The advantages claimed are as follows:

1. Will increase production.
2. Will reduce labor costs.
3. Will reduce percentage of waste.
4. Will prolong life of dies.
5. Will prevent accidents to operators.

There is another advantage claimed for Ribbonoid, and that is that articles made from Ribbonoid come out finished and do not require any further plating, polishing or refinishing.

Patents covering machinery and equipment have been applied for in this country as well as several foreign countries.

The Company is ready to send samples and complete information regarding its new metal, to all who may be interested. Write either to their main office at Peru, Illinois, or to their Eastern Agents, firm of R. Rothschild, 211 Norman Ave., Brooklyn, N. Y.

LAVA CRUCIBLE

The Lava Crucible Company, of Pittsburgh, announces that it is placing on the market a new type of crucible, which, compared to the old graphite crucible, is making extraordinary records. It is claimed that users are averaging from 90 to 100 heats per pot in sizes ranging from No. 60 to 100. Other reports state that No. 300 pots in all furnaces are running 55 to 60 heats. It is not claimed that everybody can get such service, but that such records are possible.

Additional advantages claimed are a minimum of shrinkage and burning down from the top; uniformity in the number of heats obtainable from pots; ease and safety in handling, that is, ordinary rough treatment will not cause injury.

The Lava Crucible Company also makes a refractory cement called "Lavapatch" which it recommends for furnace linings for the following reasons:

It will not crack or peel off; it will not flux or slag; it will resist the erosion of a cutting flame and mechanical abrasion; it may be used for hot or cold patching; it is sold ready to use with no additional mixing; it will resist temperatures beyond the range of ordinary refractories, and it will not contaminate metals.

TERCOD CRUCIBLE

The Electro Refractories Corporation of Buffalo, N. Y., has placed a crucible on the market which it states has the following qualities:

It does not require any drying or annealing. This eliminates the necessity of carrying large stocks.

Not injured by gas or oil flames.

Rapid cooling or heating will not crack the pot.

They are made of a compound which is a high conductor of heat. This saves fuel and increases production.

Not affected by fluxes used in melting copper, brass, silver or gold.

The walls do not get thinner. This eliminates loss of metal due to cracking.

It is also stated that crucibles of No. 40 to No. 100 in size, an average of 100 heats per pots can be obtained. Among the users of this crucible are Rome Brass & Copper Company, Rome, N. Y.; Detroit Lubricator Company, Detroit, Mich.; Plume & Atwood Manufacturing Company, Waterbury, Conn.; American Brass Company; Stamford Rolling Mills, Stamford, Conn.; Detroit Copper & Brass Company, Detroit, Mich. It is emphasized that in the manufacture of these pots only American materials are used.

FURNACE FOR MELTING SOFT METALS

To meet the demand for a low-cost, medium size gas furnace for melting soft metals, the Johnson Gas Appliance Company, Cedar Rapids, Iowa, announces its No. 300 furnace, here illustrated. This furnace stands 28 inches high, weighs 100 lbs., and has a removable cast iron melting pot holding 150 lbs. of metal.

Its three Johnson Patented Atmospheric Bunsen Burners are stated to develop any desired temperature up to 2,250° F., and to consume only about 40 cubic feet of gas per hour. Burners have shut-off valves and pilot lights. Two burners are sufficient for keeping the metal molten.

The high efficiency claimed for this melting furnace is ascribed to the Johnson Direct Jet Regulators in its Bunsen burners.

This regulator, with an orifice that can be instantly adjusted to any pressure or quality of gas, sends a sharp, solid jet of gas with great force up the center of the mixing tube at main pressure without the use of forced air blast or blower, producing the highest possible flame temperature. This furnace is being offered at the price of twenty-five dollars.

METAL CYANIDES FROM AIR

The first commercially successful process for fixing the nitrogen of the air in the form of a chemical was discovered 27 years ago. The purpose of the investigations was to make cyanide, but instead of getting cyanide it was found that the substance obtained was another with valuable properties as a fertilizer material. This new substance, known as cyanamid, received the entire attention of the industry for practically the next 20 years. The factory of the American Cyanamid Company is located at Niagara Falls, where electricity is available for running the electric furnaces required in this process. The production of nitrogen products derived from this plant is valued at about $10,000,000 per annum.

From the earliest days of the cyanamid industry it was known that cyanamid by fusion with salt could be converted into cyanide. The particular method of carrying out the reaction, however, was never successfully developed until the latter part of 1916, when the blockade of German exports of cyanide to America brought the problem to a focus. As a result of extensive researches the method of making cyanide

was finally solved and commercial shipments of cyanide began in January, 1917.

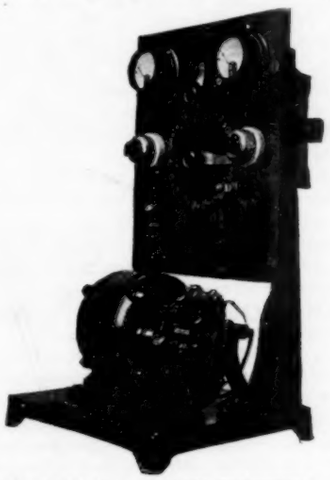
For the first two years of operation all the cyanide produced was shipped to Mexico for use in the extraction of silver ores. Since that time the use of the product has been extended to the extraction of gold and silver in practically every mining district in the world. Today, it is claimed that cyanide made from the nitrogen of the air at Niagara Falls holds first place in the tonnage consumed in the mining of precious metals throughout the world.

Another important use of this air-nitrogen cyanide is for conversion into liquid hydrocyanide acid, of which about two million pounds per annum are used for fumigating citrus fruit trees in California.

A recent development of interest to the electro-plating industry is the production of metal cyanide from this air-nitrogen cyanide. Copper cyanide, zinc cyanide, and silver cyanide of a high standard of purity are now being produced, it is stated, and furnished to the trade.

NEW RECTIFIERS

Morrison & Chaix, 650 Polk street, San Francisco, Cal., have developed and are ready to market a type of rectifier whereby storage batteries are charged by connecting to the line in multiple instead of in series. This, it is claimed, is accomplished with the same efficiency as their types S. B. & D. B. series connected, by charging at a low voltage and high amperage, the amperage rate automatically taking care



MORRISON & CHAIX RECTIFIER

of itself as the batteries become charged. By means of the pulsating current derived from this type of rectifier and the self regulation of amperage charge, we eliminate practically all the gassing of the batteries, the heating and buckling of the plates and are able to charge batteries in less than one half the time now required by connecting the batteries in series. This pulsating current is also developed on the plating type of rectifier.

Their electro plating type of rectifier is built in two standard capacities: 150 ampere capacity with 6-9 and 12 volt regulations and 300 ampere capacity with 6-7½-8½ and 12 volt regulations. Larger capacity outfits built on order.

CARBORUNDUM ANTI-SLIP TILE

The American Abrasive Metals Company, of 50 Church Street, New York City, the manufacturers of Feralun, Alumalun, Vulcalun and Bronzalun anti-slip treads announce their appointment by the Carborundum Company of Niagara Falls, to act as U. S. sales representatives through whom will be marketed the Carborundum **Anti-Slip Tile.**

The need for such a product is especially appreciated by Safety Engineers, Architects and others acquainted with the causes of accidental injury, when planning new buildings and providing for repairs and maintenance of existing structures such as foundries.

It has been learned by long experience and observation of the action of people, alone and in crowds, that there is decided slowing down when the walkway surface is slippery. Each one becomes careful, consciously "watching his step." As the slippery condition is lessened the crowd moves faster and with less effort, until the maximum of speed is reached on a surface of just sufficient frictional resistance to prevent slipping but not retard foot action. With more frictional resistance the crowd's speed rapidly decreases because the extreme "bite" in a walkway surface draws attention again to the action of walking. These observations and experiences have established the right proportion of abrasive, which is the anti-slip element and the correct density of product to secure the best results in traffic speed, comfort and safety, and at the same time insure durability so great that millions of persons walking over it have not caused noticeable wear in ten years.

Architects will be particularly interested in learning that there is now obtainable an effective and extremely durable anti-slip walkway surface that is also architecturally satisfactory in appearance and that can be obtained in attractive colors.

Samples and literature may be obtained for the asking from the U. S. Sales Representatives of the Carborundum Tile, the American Abrasive Metals Company, 50 Church Street, New York City.

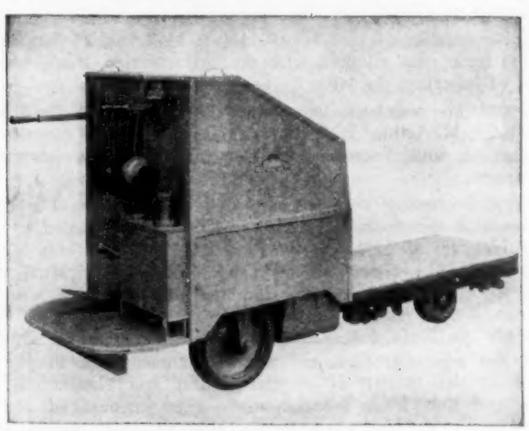
NEW PLATFORM TRUCK

A gasoline powered elevating platform truck to be known as the Clark Truklift has been put in production by the Clark Tructractor Company, Buchanan, Michigan, manufacturers of gasoline driven industrial trucks and tractors.

The Clark Truklift conforms in appearance and uses to the electric elevating lift trucks which have been used in industrial plants for many years but low initial cost, ease of maintenance, flexibility, and continuous twenty-four-hour service are distinguishing characteristics claimed for it by the builders. The loading platform is 26″ wide x 54″ long and will elevate its load of 4,000 lbs. from a minimum of 11″ to a maximum of 16″ from the floor in eight seconds; automatic stops provide for both up and down limits; elevation can be stopped by hand control lever at any point.

The lifting mechanism is operated by hydraulic pressure. Power for locomotion and elevating the load is derived from a 15 horsepower 4 cylinder tractor engine with a 3⅛″ bore and 4½″ stroke. The engine is mounted at the rear in a closed compartment containing transmission, governor, vacuum tank, radiator, et cetera.

A three point suspension is used; the steering wheel forks being supported in a steel casting which is pivoted at the center



CLARK PLATFORM TRUCK

of the frame on a chrome nickel steel pin 2″ in diameter. The drive is through a Clark bevel gear axle equipped with ball and roller bearings located under the loading platform. Driving wheels are cast steel with pressed on rubber tires 10½″ x 5″; steering wheels are cast steel disc type with pressed on rubber tires 16″ x 3½″.

The driving and elevating controls are mounted on the rear of the engine compartment and are operated by the driver who drives standing. The brake lever pedal is under the driver's foot and so arranged that the Truklift stops automatically if for any reason the operator steps off while the machine is running.

ASSOCIATIONS and SOCIETIES

REPORTS OF THE CURRENT PROCEEDINGS OF THE VARIOUS ORGANIZATIONS

BRASS MANUFACTURERS

The National Association of Brass Manufacturers held one of the most successful meetings in its history at the Old Colony Club, Hotel Tuller, Detroit, on Tuesday, Wednesday and Thursday, May 23rd, 24th and 25th, the first days being given over to the meeting of the Board of Trustees, Committee on Standardization, Elimination and reports of officers, and on the 25th the general session was held and many things of general interest to the trade transpired.

It was decided that bath cocks should be quoted, including hose connection and where not supplied, to deduct for them. The general feeling prevailed that this, while a small matter, in the aggregate amounted to a great deal. Likewise, that this was a useless appendage to the plumbing fixture, and had no practical value, and bearing this assertion out, the statement was made that if a thousand bath rooms were inspected, it would reveal that 995 would be without this connection. Therefore, along the lines of conservation and furnishing the public a practical and usable article for the least money, the feeling prevailed that all manufacturers, through their sales forces, jobbers through similar forces, contractors and plumbers, should discourage putting this useless cost, though small, upon the owner or public, where it serves no good.

It also developed that bibbs with new form of hose end are more practical and popular and are being daily brought into more general use as they are more satisfactory and making a tighter joint that avoids leaking:

Also developed that the standard uniform size of catalog of 7½ x 10⅝" was being generally used.

The matter of stamping name on goods was taboo, and while here and there a jobber may ask this service, a poll of the meeting indicated the source of these requests and also developed the fact that a number of manufacturers had been approached on this subject and positively declined, the feeling prevailing that the manufacturer should advertise himself rather than others.

A ban was put upon a resolution endorsing the deferred payment plan on plumbing goods as being inimical to the interests and unpractical in this line.

The Trade Acceptance form advised by the United States Chamber of Commerce, was approved.

China handles of size 1-1/6", 1-½", 1¾" and 2" for the china sleeve form, was adopted with the uniform size, shape, color and kind of lettering, the latter to apply to all handles.

Urged all members to support the Stephens-Kelly Bill and the Edge-McArthur Bill, the latter authorizing a commission to co-operate with Secretary Hoover on the matter of trade associations.

Very interesting reports were delivered by Mr. Forbes, who represented the Association at a recent meeting called by Secretary Hoover, of representatives of Trade Associations in Washington, D. C.; also National Councillor Adolph Mueller, who attended the meeting of the Chamber of Commerce, which was addressed by President Harding, Secretaries Hughes and Hoover and Mr. Balfour of England, the general purport of which was that the administration and the Government are deeply interested in the matter of standardization and elimination in all lines and that trade associations will be encouraged and dealt fairly with by the government; also received report of Mr. E. C. Eckhouse who represented the Association at the meeting of the National Pipe & Supplies Association in Pittsburgh, May 16 and 17.

Mr. Legner reported for Director Speakman of the Trade Extension Bureau on the splendid work that organization had done and urged all members who had not as yet contributed, to do so and for those who had already done so, to add to their subscriptions, the feeling prevailing that to a very large extent, the healthy conditions prevailing in this line were due to the splendid work of this Bureau.

A fling was taken at the jobbers soliciting free samples and the feeling expressed that the better jobbers would hardly make an unbusinesslike request of this kind, but after canvassing the situation and the requests of this kind that had been made and declined, it developed that no member was doing this, some even stating that they charge for postage and packing of same when furnished.

A letter from Mr. H. A. Wheeler of the Chamber of Commerce of the United States, advised that the cornerstone of the temple to American Business had been laid at the Nation's Capital and same would be erected on the OPEN SHOP PLAN. The Association authorized a donation of $500.00 towards this temple.

Poll of the meeting indicated that business for the first few months of this year, as compared with last on the basis of percentage, showed an increase of 67½%.

The matter of wages was considered stationary; no recent reductions had been made, nor were contemplated and scarcity of help indicated in some quarters, and with the increasing volume of business, the feeling was generally expressed that in sixty or ninety days, the man who had goods would have no trouble in disposing of same and would be considered fortunate rather than otherwise as every guide post leads to an increasing and betters business.

All manufacturers and non-members were extended a cordial invitation by President Lawnin, to become identified with this Association, if for no other reason than to co-operate with our government in response to the call of Secretary of Commerce Hoover, to give business trade associations the standing and place in this nation, that they are so justly and fairly entitled to, and which the general opinion prevails, they have not been accorded up to this time.

The meeting then adjourned, to meet again at the same place, the Old Colony Club, in the City of Detroit on September 6, 7 and 8.

THE NATIONAL ASSOCIATION OF BRASS MANUFACTURERS,
Wm. M. Webster, Commissioner.

AMERICAN FOUNDRYMEN'S ASSOCIATION

OBERMAYER PRIZE AWARDED

Out of the eight foundry devices submitted in competition for the Obermayer prize at the Rochester show as photographs, blueprints, working models, or actual samples, the committee appointed by C. R. Messinger, president-elect of the American Foundrymen's Association, selected that offered by Edwin Jory, National Transit Pump & Machine Company, Oil City, Pa. The device may be adapted for the production of various types of castings, but in this particular instance was fitted up for making 3-way valves entirely in greensand. Briefly, the greensand core is made in a split box, one-half of the corebox is removed, the drag part of the mold is inverted, attached to the remaining half of the corebox and both mold and core are rolled over, the remaining half of the corebox then is removed and the cope half of the mold is set in place on the drag. The other exhibits included an adjustable clamp, a hand operated jolting machine, a compression type corebox, a crane gong, a gear and worm pouring device to be attached to the ladle bail, a cupola reservoir and a mold jacket designed to eliminate the use of slip jackets, bands and snap flasks.

NEW YORK BRANCH, A. E. S.

The regular meetings of New York branch of the A. E. S. were held on June 9 and 23, at Broadway Central Hotel, President Philip Morningstar presiding. William Voss reported the progress of the proposed booklet on plating compiled by the New York Branch Laboratory Committee. A summary of contents was read; the opinion of the members was that it would meet a long felt want.

The booklet deals with the symbols, identification of unknown salts in plating rooms, assay gallon analysis, and many practical formulæ for plating and coloring metals. It will be available to all members of the A. E. S.

WASTE MATERIAL DEALERS

A meeting of the Metal Division was held on Tuesday, June 20th, being called to order by the new Chairman of that Division, Egmont L. Frankel. Consideration was given to the Metal Classification, as all changes must be made on or before July 1, and as a result of such consideration, the only change made in the circular was in reference to "Composition or Red Brass." Heretofore the circular has provided "no piece to measure more than 12 inches over any one part." This has caused some uncertainty and has now been qualified and made to read as follows: "No piece to measure more than 12 inches over any one part, and not to weigh more than 60 pounds." Otherwise the paragraph covering Composition or Red Brass in the Classification circular remains unchanged.

The Traffic Department was instructed to get in touch with all members of the Metal Division asking them to suggest any adjustments in reference to freight rates which would be of benefit to them as individual members or to the trade in general, such suggestions to be taken into consideration by the Traffic Department in work which is planned in connection with lower freight rates.

AMERICAN ENGINEERING COUNCIL

What in influence, in accomplishment and outlook may be characterized as the most successful meeting in the history of the Executive Board of the American Engineering Council of the Federated American Engineering Societies came to a close at Pittsburgh Saturday evening, May 27. Reports of officers and of committees, the address of the president, and the declarations of board members descriptive of organized engineering conditions in their respective regions, were so encouraging as, in the opinion of the engineers, to justify the conclusion that the Federation had progressed to the point where its permanence and growth were beyond question assured.

President Mortimer E. Cooley presided and, in an account of his tours throughout the country, said that every where he found evidence that the Federation idea was growing and that substantial acretions to membership might be expected in the near future. Registration of engineers, employment, federal water power, government reorganization, reforestration, were among the leading topics disposed of by the board after discussions more thorough and more inspiring than at any board meeting yet held.

One of the most important acts of the board was the adoption of the report of the Committee on Registration of Engineers, which Colonel Arthur S. Dwight, of New York, is chairman. The report as adopted contains the statement "that the reasons which justify the registration of engineers responsible for public work do not apply to mining engineers."

Progress in a national survey of the two-shift day in American industries was reported by the Council's Committee on Work Periods in Continuous Industries. This survey, called the most extensive of its kind ever made, has been in progress for more than a year, and purposes an exposition of industrial conditions which shall form a basis for establishing the relative merits of three shifts of eight hours each and two shifts of twelve hours each.

Dr. H. E. Howe, of the National Research Council, Washington, is chairman of the committee, which has, it was announced, investigated, and accummulated an enormous amount of data, in the metal industries, glass and cement, lime, brick and pottery, the chemical industry, sugar, salt, petroleum, cottonseed and other vegetable oils; paper, flour, rubber, miscellaneous manufacturers, mines, electricity, gas, water, ice, transportation, communication, care-taking and personal service.

Personals

Louis Schulte, foreman plater and consultant, well known throughout the plating trades, is now with the Engineering Department of the Hanson & Van Winkle Company, New York.

H. F. Hoevel has been appointed manager of the sand blast department of the H. W. Paxson Company, in Philadelphia. He has developed a new line of improved Hoevel-Paxson Sand Blast Machines.

John F. Schurch has been elected a Vice-President of Manning, Maxwell & Moore, Inc., and on June 1st will take charge of their western sales, with headquarters at the Company's Chicago Office, 27-29 North Jefferson street, Chicago.

Carl F. Dietz, president of the Bridgeport Brass Company has been appointed national councillor of the Manufacturers Association of Connecticut of the Chamber of Commerce of the United States, to succeed C. L. Jackson, secretary to the president of the association.

John B. Fay, who has been president of John B. Fay and Company, Inc., Philadelphia, Pa., which has discontinued business, is acting as representative of manufacturers in the plating and polishing apparatus and supplies lines, and has opened an office at 1072 Drexel Building, Philadelphia, Pa.

Guy Hamilton, who for the past two years has been engaged in other work, returned to the sales department of Osborn Manufacturing Company, Cleveland, Ohio, manufacturers of foundry and plating supplies, on June 1st. For several years Mr. Hamilton covered various sales territories for the Osborn Company.

E. W. Cannell became manager of sales extension for the Osborn Manufacturing Company, Cleveland, Ohio, on June 15th. Mr. Cannell has been with the Osborn Company for over ten years. For several years he was advertising manager, and more recently has been covering an Ohio sales territory.

C. L. McMaster, formerly assistant sales manager for the Cleveland Brass and Copper Mill, Cleveland, Ohio, and also at one time connected with the Pratt and Lambert Varnish Company, has been appointed sales manager for the Holmes Bronze Foundry Company, Bedford, Ohio. Mr. McMaster was graduated in engineering from the Ohio State University, Columbus, Ohio, in 1905.

P. H. Falter, has been elected vice-president and treasurer of the Electric Furnace Construction Company, 908 Chestnut street, Philadelphia, Pa., manufacturers of electric furnaces. Mr. Falter is a graduate of the Engineering Department of the University of Michigan, and until recently has been vice-president and general manager of the Canadian Electro Products Company, at Shawinigan Falls, Quebec, a subsidiary of the Shawinigan Water and Power Company. Prior to this connection he had been general manager of the Baltimore Electric Alloys Company, and for 13 years with the Aluminum Company of America in various capacities, including the design, construction and operation of a number of its plants. He was also general manager of the Shawinigan Electro Metals Company, Montreal, manufacturers of metallic magnesium.

Deaths

ISAAC JOSEPH

Isaac Joseph, president of the Edna Brass Manufacturing Company, Cincinnati, Ohio, and president of the Isaac Joseph Company, iron dealers, died at the age of 62 at his home in Cincinnati, on May 23.

PATRICK JAMES DOYLE

Patrick James Doyle, secretary of the Worcester Brass Company, Worcester, Mass., died through accidental asphyxiation at the age of 62 years.

MARCUS HENRY VAN BERGH

Marcus Henry Van Bergh died early in July at his home, No. 198 Culver road, Rochester, N. Y., aged 65 years. He had been ill about two weeks. He was born in Brockport, N. Y., on October 13, 1856, and came to Rochester with his parents when a year old. He was educated in Rochester and in New York.

Mr. Van Bergh went to Australia in 1881, where he married. After fifteen years in that country he returned to Rochester and formed a co-partnership with his brothers, Frederick and Morris E. Van Bergh. Thus was established the Van Bergh Silver-Plating Company. He was secretary and treasurer of the firm until 1916, when he retired from active participation in the company's affairs. He became a vice-president, however.

Mr. Van Bergh was also a member of the board of directors of the Taylor Instrument Companies and treasurer of the Moon Insurance Company. He was a prominent Mason and belonged to many clubs.—G. B. E.

WILLIAM GLEASON

William Gleason, founder of a machine-tool firm in Rochester that has grown from its inception more than half a century ago to the greatest industry of its kind, died May 24 at his home, No. 15 Portsmouth terrace, aged 86 years. Mr. Gleason had remained at the head of the Gleason works until his death, but in his later years most of the business was transacted by his sons, James E. and Andrew Gleason, who are vice-presidents of the company.

Wherever machine tools are used Mr. Gleason is known as the inventor of the first practical machine for cutting bevel gears, without which machinery the present degree of perfection in automobile construction would not be possible. During the war the Gleason works employed 1,700 men in making ordnance for the government. The plant now covers 25 acres and employs about 800 men.

Mr. Gleason was born in Tipperary county, Ireland, in 1836, and came to America when 15 years old. He completed his apprenticeship in machine shops here and then went to the Colt armory in Hartford, Conn., where he was employed during the Civil War. In 1865 he returned to this city and opened a machine shop. From that day on his business capacity developed and the Gleason works are the result of a remarkable and active career.—G. B. E.

NEWS OF THE INDUSTRY

BUSINESS REPORTS OF THE METAL INDUSTRY CORRESPONDENTS

WATERBURY, CONN.

JULY 3, 1922.

Reports, believed to be authentic, that the **Anaconda Copper Mining Company,** through the American Brass Company, is closing negotiations for the purchase of the plant and business of the **Brown Copper and Brass** rolling mills at New Toronto, were partially confirmed here by American Brass officials, although no official statement was given out. President John A. Coe said, "There may be something to it. We will not deny it, but we will not be ready to make any statement for a few days."

It is reported that the acquisition of the New Toronto plant will mark the beginning of the entry into Canada of the Anaconda-American Brass combine. A new plant may be built in the vicinity to be operated in conjunction with the Brown mill, and it is also rumored that Anaconda interests are negotiating for zinc properties in western Canada. The New Toronto plant is about half as large as the average size of the company's plants in the Naugatuck valley. Local manufacturers state that the proposed purchase would be a help rather than a hindrance to the growth and prosperity of the brass industry in this section.

That business is much improved can be seen in the wholesale let-up of applications for alms at the city charities department, and the first breathing spell in two years for the office.

The affairs of the Eastern Brass & Ingot Corporation have received a considerable airing in the courts recently. The company, which came into being during the war is now in a receiver's hands and owes about $20,000 with no visible means of paying it. Attorney J. H. Cassidy, acting for certain creditors, among them being the Scovill Manufacturing company and the American Brass company, asked Judge Thomas in the United District Court to deny the application of the receiver to sell $25,000 worth of property on the ground that thereby certain creditors would be given preference over others, and to dismiss the suit of the General Trust Company of Illinois against the concern on the ground that the court had no jurisdiction.

Judge Thomas refused to dismiss the suit of the Central Trust Company but ordered the sale of the $25,000 worth of scrap brass held up and sustained the objection to the $500 interim allowance. He refused to grant Attorney Cassidy's application for permission to conduct examinations in bankruptcy proceedings against the firm but gave permission to conduct examinations in equity before the referee in bankruptcy. At that examination it was brought out that the president, Howard F. Baker, had received $10,000 a year and the vice-president $7,500, although the plant had never employed more than 30 men and at present employed but three. Checks were also shown, totaling over a thousand dollars, paying the president's expenses and dues at the Country club, the Waterbury club, the Union League club of Chicago and the Old Colony club of Boston, all paid by the company and charged against traveling expenses. Among the stockholders of the concern are Kenesaw M. Landis, the baseball head, and General Charles G. Dawes, director of the United States budget. At the hearing June 26, President Baker was not present although ordered to be by the referee. The referee made a note of his absence and continued the case until July 11.

The flood of German goods into American markets is alarming heads of local factories. Frederick E. Bartlett, vice-president of the American Pin company, is of the opinion that unless immediate steps are taken American industry will be seriously retarded. "It is generally admitted and conceded," he said, "that American manufacturers cannot compete with German manufacturers because of the undreamed of low prices at which the latter's goods are being manufactured. We are paying $4 a day to a man for doing the same work which a man in Germany receives only 90 cents a day." Added to this was the difference in exchange and the fact that Germany needed American money so badly that it was willing to place its goods in American markets at any price. German-made thermos bottles are being sold here for 60 cents, he said, while the top alone could not be produced in this country for the price.

A combine has been effected between the Winchester Repeating Arms Company of New Haven and the Simmons Hardwood Company of St. Louis, with a probable capital of $22,000,000. The combination of one of the largest manufacturing establishments in the east and the greatest distributing organization in the country, is of great importance locally as it will undoubtedly result in more brass orders for the local plants. The combination will be under the Winchester management. The latter will continue to be a manufacturing unit and the Simmons company a distributing unit. The latter has been doing business for half a century and in its largest year distributed about $44,000,000 worth of products. The Winchester plant had its greatest prosperity during the war when it was working largely on government orders and expanded to more than double its normal capacity. —W. R. B.

BRIDGEPORT, CONN.

JULY 3, 1922.

With the resumption of work at the mill of the American Tube & Stamping Company during the past month, with approximately one-half of the regular number of employees, revival of the brass industry in Bridgeport is easily evident. Records from 31 factories for the last week in June showed a slow continuing improvement. Since early February there has been a steady increase in the number employed, the last

week in May the number being 14,957, the number representing 59.1 per cent of normal; the hours average 57.4 per cent of normal and the hours per employee 47.6 per cent, the highest in over a year.

The last week in June the figures gathered by the Manufacturers' association from 30 plants showed 15,351 employees at work, 60.6 per cent of normal, and the average of working hours per employee, 48.5 per cent.

The **Lake Torpedo Boat Company** has submitted bids for contracts to build three undersea boats for the Chilean government. The local company, in competition with several other American submarine boat builders, were approached by Chilean officials in regard to the matter some time ago with the result that the Lake company made bids on three boats and expects to submit further bids on other boats in the last budget of the Navy department of Chili.

Henry J. Miller, a member of the board of directors, has been elected president of the Lake Torpedo Boat Company, to succeed his brother Herbert S. Miller, who died recently.

"Made in Bridgeport Products" week was observed here last month, all the principal stores devoting their windows to display of products made in this city. The American Hardware Stores devoted six windows to the purpose. Among the factories whose products were exhibited were the Bridgeport Brass Company, the American Chain Company, Bead Chain Company, Crane Company, Remington Arms Company, Jenkins Valve Company, Bridgeport Safety Wheel Company, Harvey Hubbell Company, Bryant Electric Company, Bridgeport Metal Goods Company, Challenge Cutlery Company, Handy & Harmon, Gaynor Manufacturing Company, and Bassick Manufacturing Company.

The display of bronzes made by the **Weidlich Company** were especially attractive, as were the samples of cutlery of the Remington Arms Company and the chests of silverware by the Holmes and Edwards Company.

Production at the **Holmes & Edward Silver Company,** branch of the **International Silver Company,** has reached normal capacity again and the factory in this city is turning out an average of 350 gross of silverplated ware per day.

The **International Silver Company** has declared a quarterly dividend of 1¾ per cent on its preferred stock. Many employees of the local factories are holders.

William T. Hoy, of Laurel Beach and New York has organized the **Hoyt Silver Company** which will build a plant in Milford. The company is the successor of "Reward, Inc.," which was organized by and for the hotel and restaurant men for producing hotel silverware.—W. R. B.

TORRINGTON, CONN.

JULY 3, 1922.

Employment conditions in Torrington factories are now practically on a normal pre-war basis. Every man who wants work has a job, though all can not pick and choose as to the character of their work. Several of the shops will close during July for brief periods for inventory and repairs. These shut-downs will be temporary, however, varying from one week to three weeks.

Clifford W. Post and family have returned from England, where for the past three years Mr. Post has been manager and managing director of the Torrington Company's plant at Coventry. Mr. Post continues with the Torrington Company but is not yet certain as to which field he will be assigned.

Dr. Thomas G. Thompson, formerly with the chemical department of the American Brass Company, but now professor of chemistry in the University of Washington, Seattle, Wash., was married on June 27 in British Columbia to Miss Harriet Galbraith. Dr. and Mrs. Thompson are spending part of their honeymoon in Torrington.

Eugene J. Bartram, of the Torrington Manufacturing Company has been elected president of the Community Co-operative Company filling the vacancy caused by the resignation of Walter Harrison, of the Coe Brass group, who resigned. George Westerman, of the Coe Brass group is the new vice-president.

Alice Brooker Doughty, 75, widow of James A. Doughty, former vice-president of the American Brass Company, died at her home here on June 8, after a long illness. Her husband died only a few weeks previously. One daughter, Marion S. survives. Mrs. Doughty was born in Torrington, a daughter of Samuel Brooker, and spent all her life here.

Upon the death of Mrs. Doughty on June 8, several public bequests made by the late James A. Doughty became effective. These included: $5,000 each to the Gaylord Farm Sanitorium at Wallingford, the Charlotte Hungerford Hospital and the Maria Seymour Brooker Memorial, and $2,500 each to the Torrington Y. M. C. A. and the Center Congregational church.

A certificate of organization has been filed by the **Graham Manufacturing Company,** of Torrington. James H. Graham is president, and Joseph F. Graham, secretary and treasurer.—J. H. T.

NEW BRITAIN, CONN.

JULY 3, 1922.

A comprehensive review of conditions confronting the metal manufacturing concerns in this city this summer could be summed up in the one phrase that: "Business has improved greatly and a continuance of bettered conditions is expected."

The Metal Industry correspondent has taken occasion to inquire definitely from those in charge of the bigger concerns as to just what the outlook is and in every instance it was not only encouraging, but also optimistic for the immediate future. It was also said that due to improved business conditions there is no necessity for there being any able bodied men out of employment in this city; that if there are any it is because they do not care to work. Recently a group of Detroit manufacturers sought skilled labor here, but was unsuccessful in securing recruits.

At the **American Hardware Corporation,** which is composed of the P. & F. Corbin factory, the Corbin Cabinet Lock Company, the Russell & Erwin Manufacturing Company and the Corbin Screw Corporation, an official statement given out said that, in round figures, the business of the corporation has increased from about 30 per cent below pre-war time normalcy to about 80 per cent normal. Business is showing a continued improvement and there is a great demand for equipment used in outfitting new buildings.

At the **Stanley Works** and the **Stanley Rule & Level Company** the same encouraging reports were given out. There is a good demand for carpenters' tools and the cold rolled steel business at the first named concern is booming.

The **Beaton and Cadwell Manufacturing Company,** which makes all sorts of small metal novelties, including fancy bath fixtures, reports unusually good business and is operating at practically capacity.

The **North & Judd Manufacturing Company** is admittedly one of the busiest in this section and the **Landers, Frary and Clark Company** is finding a big demand for its cutlery output as well as its electrical devices, although at this time of the year the demand for aluminum products is at a minimum. —H. R. J.

ROCHESTER, N. Y.

JULY 3, 1922.

With the first month of summer virtually at an end, business prospects among the manufacturing institutions using metals is apparently somewhat improved. With the advent of July, however, a number of the larger plants about Rochester will shut down for a week to ten days. This vacation period has become an annual affair among a number of Rochester industries. It occurs usually in the hottest part of the summer season, and during the shut-down it enables the clerical staff to check up or make a semi-annual inventory of business in general. According to a large majority of the workers, this vacation season is planned in advance, and no one is a sufferer from a financial viewpoint. Hundreds take advantage of the lay-off to recuperate in more ways than one.

A number of foundries will close down on July 1, it is announced, among them the Northeast foundries. The shut-down period will be of less than a fortnight's duration.

The local market for brass and copper materials, as well as tin and aluminum, is quiet but not inactive. There is a firm demand for finished materials for building purposes in all four metals. The lead market is dull.—G. B. E.

TRENTON, N. J.

JULY 3, 1922.

Trenton metal manufacturers are well pleased with business conditions at the present time and say that the future looks bright. New orders are beginning to come in and it is believed that there will be no curtailment during the present summer. **William G. Wherry,** president of the **Skillman Hardware Manufacturing Company,** who recently returned from a trip through the west, said that the future looks very optimistic "while the coal strike is injuring business," he said, "and the threatened railroad strike is causing a scare, I have every reason to believe that there is a bright outlook ahead. The building operations are brisk in the various cities and I believe that there will be plenty of work during the coming fall and winter."

M. M. Fleron & Son, 113 North Broad street, Trenton, has been incorporated with a capital stock of $100,000 to manufacture and deal in radio supplies. Controls of designs of the radio equipment to be marketed is vested in the Flerons through patents. Actual making of the parts required is being done for the firm under contracts with the Ingersoll-Trenton Watch Company, the Pyrolectric Instrument Company and the Star Porcelain Company. Connections have been established with Chicago and San Francisco houses which handle the Fleron line.

Edward B. Fulper, dealer in acids, chemicals, dyes and colors, has opened a new warehouse at 283 North Willow street, Trenton, N. J., which includes a motor truck delivery service. The offices of the company will later be removed there from the American Mechanics building. Mr. Fulper has been engaged in the business for the past twenty years, being vice-president of the company.

The **Kieckhofer Container Company,** Camden, N. J., has awarded a contract for a two-story brick and steel factory at Thorne and Cooperwood streets, Camden, to cost $500,000.

The **Republican Can & Metal Company,** of Brooklyn, N. Y., has been consolidated with the Canister Manufacturing Company, of New Jersey, whose main plant is at Phillipsburg, N. J. R. W. Darnell, of the Canister Company, is the general manager of the new company.

The **Durst Manufacturing Company,** of Chambers street, New York, is negotiating for a lease of part of the plant of the **American Can Company** at Kenilworth, N. J.

Vitrelain Products Company, of Newark, N. J., has been incorporated at Trenton with $100,000 capital to deal in plumbing supplies.

Vice Chancellor Backes, of the Court of Chancery, has issued a temporary injunction prohibiting further sale of stock in the **Magna Metal Company,** of 227 High street, Newark, N. J., and preventing payment of salaries to its officers. This action followed an argument on the appointment of a receiver. The complainants were Walter Lohrey, of Glen Ridge, N. J., one of the founders of the company, and Louis Kempa, of Newark. The company settled with the two men, but other stockholders petitioned the court to keep the issue alive. In the argument of counsel it was admitted that the company's authorized capital is $12,500,000 and that $935,000 of this amount has been subscribed in stock. The Dudley Sales Company, which conducted the stock selling campaign of the company, received $412,000. One hundred and thirty-six thousand dollars was paid for organization expenses and $175,000 for the development of the company's business. Counsel for the company denied the charge of insolvency and said the concern's obligations did not exceed $40,000.—C. A. L.

PROVIDENCE, R. I.

JULY 3, 1922.

Business among the metal trades in this city has experienced a slow but gradual improvement that has been so quiet that few have realized the fact excepting in the volume of the month's business. No boom or rush has resulted but the increase has continued right along easily and methodically. This is especially the case among the trades that are connected with the building lines, as well as those that are in the tool making and machinery branches. In the jewelry lines there has been little if any improvement and the immediate outlook is far from promising.

One of the most noticeable features of the metal trades has been the unusual number of concerns that have become incorporated during the past month, the majority being in the jewelry branches. The number of unemployed in the metal trades throughout the State is considerably less than it was two months ago, but generally speaking there has been a wage reduction in practically all lines.

Reardon Supply Company, Inc., of Providence, is the name of a concern that has obtained a charter from Secretary of State Parker. The corporation will deal in plumbing supplies and is capitalized at $10,000.

Articles of association for the **Automatic Meshbag Company,** which will engage in the jewelry manufacturing business at 70 Ship street, Providence, have been filed with the Secretary of State. The authorized capitalization is $200,000.

The **George L. Parker Company** has been awarded the contract for the galvanized ornamental work on the new business block at Broadway and Sabin street which will include a marquise and all the copper work on the store fronts.

The **M. & K. Novelty Company** has been incorporated to engage in the jewelry manufacturing business in Providence. The authorized capitalization is $25,000 and the incorporators are Morris Millman, Max Katz and Joseph Millman, all of Providence.

Silver & Drain Company have the contracts for the sheet metal work on the new chemical laboratory at Brown University; also for the new school building on Sackett street, for the city of Providence.

The **Wolk Jewelry Company,** which has been conducted by Simon Wolk and which has been offering 50 per cent settlement with liabilities estimated at $4,767 and assets of $2,568 has closed its factory and discontinued business.

The **City Brass Foundry,** 21 Slater avenue, Pawtucket, reports an increasing business on brass, bronze and aluminum castings.

The **Standard Welding Corporation,** of Providence, has been incorporated with a capital stock of $25,000.

The **Rhode Island Metal Products Corporation** has been granted a charter by the Secretary of State under the laws of Rhode Island at a capitalization of $10,000 for the manufacture of metal products with headquarters in Providence.

Universal Safety Ash Tray Company, Inc., has moved its factory from 10 Summer street, where it had outgrown its space, to 136 Hospital street, where it will occupy the entire three-story building together with several other buildings.

Joseph F. Farrell, of the Architectural Bronze Department of the Gorham Manufacturing Company, told the members at the recent weekly luncheon of the Providence City Club, of the beauty of the bronze and the process of making it as well as the infinite care and pains necessary in making all kinds of statues, tablets and other articles for architectural use of this metal. As an example of architectural work in bronze, that in the new banking rooms of the Rhode Island Hospital Trust Company in Providence, was cited, this being described as one of the finest in the United States. Mr. Farrell declared that the United States produces the finest bronze in the world, although the best sand for casting figures in bronze comes from France.—W. H. M.

CLEVELAND, OHIO

JULY 3, 1922.

The most salient fact in business activities in Cleveland is the enormous increase in the output of the automobile factories. A big gain is also noticeable in iron and steel plants, while metals and metal products, other than iron and steel, are slowly going up.

Corporations in this district are trying to cut down expenses and to sell goods at lower prices with a fair amount of profit. As an interesting feature of this effort mergers in several industries including automobile parts manufacturing, brass foundries, certain lines of machine and tool making and others is expected. Merger in factories making automobile parts would make for economy for these plants must install large and costly machines and often these machines are idle part of the time. If they would merger, they could probably

keep one set of machinery busy all the time and produce a good profit by so doing.

Increasing business has made it necessary for the **National Bronze and Aluminum Foundry Company** to add 150 feet to its plant at East 85th street and Laisy avenue.

Trouble between Cleveland employers and the International Molders' union over wage cuts has come to ahead. A few men have left their jobs, but it is stated that a strike is not contemplated. Officers of the Cleveland union are taking no part in the controversy.

At a formal dinner of the **East End Manufacturers' Association**, the open shop as defined by the Cleveland Chamber of Commerce and as distinguished from the closed non-union shop was urged.—C. C. C.

DETROIT, MICH.

JULY 3, 1922.

Activity in the automobile business is keeping up the brass, copper, aluminum and gray iron industry to a greater extent than was believed several months ago. Practically all factories turning out accessories are operating extensively, and indications are that they will be busy until long into the fall. There may be a lull at that time, but it is hard even to guess straight on that, for business conditions here have followed out no general trend thus far.

Building activity, especially in the middle western and eastern states, has aided largely in boosting the manufacture of plumbing supplies, although these concerns here still are engaged extensively in the production of automobile accessories and parts.

The **Ford Motor Company** closed May with one of the largest productions in its history. It still has orders that assure its continued operation for many months.

The **General Motors Corporation** also reports much activity, not only in its Detroit plants, where its headquarters are, but also in all its plants in various parts of the country. This vast concern requires large quantities of automobile accessories, much of which it manufactures itself.

The **Studebaker Corporation** also is reported operating extensively. In fact this concern has maintained a remarkable production all through the depression. Its Detroit plants are understood to be operating nearly to capacity. The same is reported at the Dodge plant and also at the Paige, the Hudson and the smaller automobile concerns about the city.

At present practically all the idle population has been absorbed, both in the skilled and unskilled fields. "Business is just fine at present," is the general expression from nearly all manufacturers. The coal strike is having no material effect on business operations here. Independent mines seem to be meeting demands and no complaint is heard anywhere of lack of fuel.—F. J. H.

LOUISVILLE, KY.

JULY 3, 1922.

Demand for brass and copper goods is improving somewhat, while the sheet metal and casting shops are busier than for some time past. There is a fair demand for copper kettle work, steam table and other work requiring sheet brass or copper, and while there is no brewery or distillery business, the local trade is fairly busy as a whole.

The big improvement shown in general industrial conditions as well as commercial should show further increase after the reduction in freight rates becomes effective. There has been some holding back on that account. Railroads are buying more freely, the Louisville & Nashville, C. & O., and some other lines having placed heavy car orders, while the plant of the **American Car & Foundry Company**, at Jeffersonville, Ind., is very busy on passenger car repairs and building of new cars. Refining operations are also taking material.

In the plumbing trade demand is so heavy that the local plant of the **Standard Sanitary Manufacturing Company** is running at capacity in meeting the demand for enamel baked tubs, brass goods, etc.

Building operations are taking a quantity of manufactured goods, as building is generally heavy. Louisville for the first six months of the year shows over $9,000,000 in new permits, far ahead of the record of 1921 for 12 months, and about double normal demand.

The **Belknap Hardware & Manufacturing Company**, large jobbers of brass goods, plumbing and heating supplies, etc., has started work on a new warehouse and office building to cost $1,200,000, contracts having been placed, and work started.

A strike of plumbers in Louisville for an increase from $8 to $9 a day, was met by the master plumbers, and everything is again serene, there being so much work that the master plumbers had to give in.

The **Hart Manufacturing Company**, operating a foundry handling general lines of metal work, is figuring on enlarging one of the casting foundries, as a result of a big increase in its residence furnace business.—A. W. W.

BIRMINGHAM, ENGLAND

JUNE 15, 1922.

Business in the metal trades continues to improve, but still very slowly. All trades are suffering more or less from the engineering lock-out. Apart from difficulties in obtaining material and plant, the serious interruption of an industry of such wide scope tends to discouragement of enterprise in manufacture, and of expenditure by the buying public. In spite of these drawbacks the number of the unemployed —apart from those idle through labour disputes—is decreasing week by week.

Hearth furniture manufacturers have experienced a revival of business. There is a good demand for "Companion" sets, coal vases, hearth kerbs and others in brass, copper and oxydised finished, but, the open fire being pre-eminently a British institution, the scope for expansion of trade is somewhat limited. Tubes and rolled metals are in slightly improved request. Increased activity in the automobile factories has provided additional employment for the aluminum foundries. Brassfounders are also getting more business in automobile fittings and accessories. Manufacturers of aluminum hollow-ware are still suffering severely, except in the better qualities, from German competition and are impatient of the delay of the Government in dealing with their application for a protective duty under the Safeguarding of Industries Act. The hook-and-eye and snap fastener trade is in a similar situation. Silversmiths and electro-platers report only small and fitful increases in business and the jewelry trade as yet shows no marked improvement.

Report business in all the metal trades is still suffering from the state of the exchanges and other adverse financial conditions. The hopes that were entertained a month ago of a revival of the British trade in brass foundry with the European continent through Holland have not been realized. At present the low value of the mark enables Germany to maintain the lead in the continental markets.

The lock-out in the engineering trades of Great Britain has come to an end, the Amalgamated Engineering Union, to whose members the lock-out was first applied, having by a ballot vote agreed to accept the employers' terms. Members of the other unions have given a majority for acceptance, commenced to return to work.

The terms accepted by all the unions are summed up in the following formula:

(a) Employers have the right to manage their establishments and the trade unions have the right to exercise their functions.

(b) In the process of evolution provision for changes in workshop conditions is necessary but it is not the intention to create any specially favored class of work people.

As affecting the A. E. U. only, there is a clause stipulating that in the terms of the overtime and night shift agreement of September, 1920, the employers have the right to decide when overtime is necessary, the work-people or their representatives being entitled to bring forward, under the provision for avoiding disputes, any cases of overtime which they may desire to discuss.

The employers, in fact, have won in their fight for liberty to exercise their managerial functions. In some districts, Coventry for instance, the A. E. U. ballot was almost a farcial proceeding, large numbers having returned to work the moment a settlement appeared in sight and some even at earlier periods of the dispute.—H.

Business Items—Verified

The **Rich-Alloy Company,** 13223 Euclid avenue, Cleveland, Ohio, has erected a plant for the refining of precious metals, and the making of products therefrom.

The **Magna Metal Corporation,** Newark, N. J., has gone into the hands of a receiver, who is John A. Bernhard, Prudential Building, Newark, N. J.

The **Philadelphia District Ordnance Salvage Board,** Frankford Arsenal, Philadelphia, Pa., will receive sealed bids for miscellaneous scrap including copper and lead. Bids must be in by noon, July 18, 1922.

The headquarters of the **American Gas Association** will be located after July 1st, on the eighteenth floor of the Canadian Pacific Building, 342 Madison avenue, New York City, telephone 4209 Murray Hill.

The **Dayton Bronze Bearing Company,** Dayton, Ohio, has leased a portion of the former Platt Iron Works, and is now located there. It operates a brass, bronze and aluminum foundry and a brass machine shop.

The **Hoffman Electro-Plating and Manufacturing Company,** Inc., has moved its plant from Paterson, N. J., to 1015 Clinton street, Hoboken, N. J., where it operates the following departments: Soft metal casting shop, soft soldering, plating, polishing, japaning and lacquering departments.

The **B. M. Martin Brass Works,** 473 West Broadway, New York, has recently increased its capital stock from $10,000 to $30,000, of which $20,000 worth of preferred stock has already been subscribed. This firm operates a brass, bronze and aluminum foundry, and a brass machine shop.

The **National Bronze and Aluminum Company,** East 88th street and Laisy avenue, Cleveland, has been granted a permit to erect an addition to its plant at an estimated cost of $9,000. This concern operates brass, bronze and aluminum foundry and casting shop.

The **Gilby Wire and Die Company,** Newark, N. J., has moved into their new factory at 108 Adams street. It manufactures fine wire in brass, phosphor bronze, steel, Monel, and nickel, and specializes in the manufacture of very fine sizes of copper wire for enameling and silk-covering.

Owing to an oversight when preparing advertisement of the **Sulphur Products Company** which appeared on a special insert in the June number of THE METAL INDUSTRY, the price of "Liquid Sulphur" was quoted at $2.25 per single gallon, f. o. b., Greensburg, Pa. The price should have been $2.15.

Otis & Company, New York, are offering a block of Class B common stock of the **Ohio Brass Company** at $55 per share. The company was founded in 1888 and is a producer of electrical railway supplies, constructive material for steam and electric railways, mine and industrial haulage high tension insulators and brass valves.

The **Mayperl Metal Frame Manufacturing Company,** Brooklyn, N. Y., has been incorporated with a capital of $20,000, by S. Mayer, F. Perlman, and H. Protter. The company operates a bronze foundry, tool room, casting shop, and plating, stamping, soldering, polishing and lacquering departments.

The **Ohio Brass Company,** 15 Exchange Place, Jersey City, N. J., has amended its charter to provide for a capital stock of 20,000 shares of preferred stock at $100 a share, 50,000 shares of Class A common stock without nominal or par value, and 50,000 shares of class B common stock without nominal or par value.

The **Cox Brass Manufacturing Company,** Albany, N. Y., has won a patent suit carried on against them by the American Chain Company. The action, which was commenced in July of last year, alleged infringement of the so-called Pancoast and Grotenhuis patents, owned by the chain company and covering an automobile bumper.

The **Black and Decker Manufacturing Company,** Towson Heights Baltimore, Md., builders of portable electric tools, announce the establishment of a new Detroit office in the General Motors Building. **C. G. Odell,** assistant to the president of the Black and Decker Company, will use this office as his base, as will also the local Detroit representative.

The **Wilson Welder and Metals Company,** Inc., 132 King street, New York, recently appointed the King-Knight Company, Underwood Building, San Francisco, Calif., exclusive representatives in Central and northern California for Wilson Plastic-Arc Welding Machines and Wilson "Color-Tipt" Metals.

The **Bolivar Foundry Company,** Bolivar, N. Y., has been incorporated for $50,000, by W. J. Brannen, W. A. Sherwood and H. J. McIntyre. It operates a brass, bronze and aluminum foundry, and also makes gray iron castings. It will probably soon be in the market for sand blast machinery and a brass furnace.

The **Gerity, Whitaker and Nagel Company,** Toledo, Ohio, has moved into its new factory and office building at 10½ Superior street. The new factory is a one-story and basement brick structure, with room for expansion. It operates a grinding room, galvanizing department, and plating, polishing and lacquering departments. There are 25 men working at present and a few more buffers are required.

The **New Haven Sherardizing Company,** 868 Windsor street, Hartford, Conn., held an exhibit in the windows of the Hartford Electric Light Company, during the week of June 5th, covering the various applications of sherardizing, particularly the use of sherardized steel in the vulcanized rubber industry. Beside their sherardizing department the company operates a tool and a grinding room.

The **Empire Brass Foundry,** 128 Wellington street, Montreal, Canada, is erecting a new foundry and a three-story building with basement, which will be completed in about six weeks. The company operates a brass, bronze and aluminum foundry, brass machine shop, tool room, grinding room, casting shop, and plating, polishing and lacquering departments.

The **Anchor Brass and Aluminum Company,** Freeman avenue, Cincinnati, Ohio, sustained a loss of $15,000 through fire in its plant on May 31. The pattern shop, which suffered the most damage, was almost entirely burned. The company operates a smelting and refining department, a brass, bronze and aluminum foundry, a grinding room, and a casting shop.

A fire in the plant of **C. G. Hussey and Company,** 2850 Second avenue, Pittsburgh, Pa., caused damage amounting to $5,000. It was necessary to close the plant for a few days, but the electrically driven mills, supplied from a local power station were able to continue work. The company operates beside the rolling mill, a smelting and refining department, a tool room, a grinding room, and stamping, tinning, polishing and lacquering departments.

The **Gem City Brass and Aluminum Foundry,** 323 Maiden Lane, Quincy, Ill., has begun operations in their foundry, which is capable of turning out two to three tons a day. The building is equipped with over head trolleys, and four furnaces for the melting of brass and other alloys have been installed. John C. Kushera, who operated a brass foundry for the U. S. Navy at Plymouth, England, during the war, is manager of the new concern.

The **International Nickel Company** has a new department of development and research which has been created by Robert C. Stanley, the new president of the company. This department will be under the direction of A. J. Wadhams as manager, with headquarters at 67 Wall street, New York. He will have associated with him Dr. Paul D. Merica, director of research. The new department will make studies of the company's products, and assist in their successful use by consumers.

The **Electric Furnace Construction Company,** 908 Chestnut street, Philadelphia, manufacturers of electric furnaces, "Electro" steam boilers, etc., report an increase in capital and the appointment of the following new officers: P. H. Falter, vice-president and treasurer; Arthur G. Dickson, of Dickson, Beitler and McCouch, Philadelphia, vice-president and counsel. And of the following new directors: John Gilbert, of Madeira, Hill & Company; William A. Webb, President Empire Coal Mining Company; and T. H. Weisenburg. Frank Hodson retains the presidency of the company.

The **Aluminum Company of America,** Pittsburgh, Pa., may lease for a period of 25 years the Aluminum Manufactures,

Inc., with plants for the manufacture of aluminum ware at Cleveland, Detroit, New Haven, Conn., and Buffalo, and other plants which have not been active for some time. The Aluminum Company of America has offered to lease the property for 25 years beginning July 1, 1922; to purchase the entire inventory at the market value, July 1, 1922; and to purchase $708,700 par preferred stock at $65 a share and accrued dividends, and the retirement of 2,000 shares a year of preferred stock. In regard to the outlook for dividends on the common stock, the lease provided for the payment of $1 a year in 1924; $1.50 a year in 1925 and thereafter for the 23 years remaining of the lease $2 a year. The stockholders of the Aluminum Manufactures, Inc., have been called to a meeting in Cleveland on June 29, when the matter will be acted upon and a vote taken.

THE INTERNATIONAL NICKEL COMPANY

CONSOLIDATED GENERAL PROFIT AND LOSS STATEMENT OF AMERICAN COMPANIES

For Year Ending March 31, 1922

EARNINGS OF ALL PROPERTIES after deducting Manufacturing, Selling Expense, Ordinary Repairs and Maintenance		$373,085.85
OTHER INCOME		234,267.45
TOTAL INCOME		$607,353.30
DEDUCT		
ADMINISTRATIVE AND HEAD OFFICE EXPENSE		
General Office Expense	$442,074.93	
Reserved for Federal and Franchise Taxes (Estimated Provision)	81,674.03	
		523,748.96
NET OPERATING INCOME		$83,604.34
DEDUCT		
Shut-Down Expense	$428,630.70	
Depreciation and Depletion (Provision for)	437,720.57	
Foreign Companies not included	15,000.00	
		881,351.27
LOSS for the Year		$797,746.93
SURPLUS, April 1, 1921		$11,886,177.21
Loss for Year as Above	$797,746.93	
Adjustment of Inventories, etc. (net)	537,833.89	
Dividends Preferred		
No. 63. 1½% Paid Aug. 1, 1921	$133,689.00	
No. 64. 1½% Paid Nov. 1, 1921	133,689.00	
No. 65. 1½% Paid Feb. 1, 1922	133,689.00	
No. 66. 1½% Payable May 1, 1922	133,689.00	534,756.00
		1,870,336.82
SURPLUS, March 31, 1922		$10,015,840.39

CHEMICAL EXPOSITION

The 8th National Exposition of Chemical Industries will be held this year in the Grand Central Palace, New York City, during the week September 11-16, inclusive. It will follow immediately upon the Fall meeting of the American Chemical Society. "Raw Materials, Machinery Products" is the way the Exposition is described and is intended to carry this main impression. The raw materials are exhibits of the natural resources. The machinery exhibits consist of apparatus, equipment, instruments and machinery for every mechanical operation in the manufacture of products from the raw materials. The products themselves are the finished products and the exhibits will contain those of organic and inorganic origin.

There are at this time 350 exhibitors who have contracted for their space locations. The program of the Exposition has been outlined and work is now in progress upon it.

The office of the managers, Charles F. Roth and Fred W. Payne, is in the Grand Central Palace, New York City, and inquiries should be directed to them there.

In connection with the Exposition it is planned to hold a general convention of industrial and microscopical photographers. The Technical Photographic and Microscopical Society was fully organized at a meeting held in the Chemists' Club, New York, on Wednesday, May 10. James McDowell, of the Sharp & Hamilton Manufacturing Company, Boston, was elected president. Thomas J. Keenan, editor of Paper, 251 West Nineteenth street, New York, was elected secretary-treasurer.

BRITISH FOUNDRY EXHIBITION

The International Foundry Trades Exhibition, the first comprehensive exhibition of the kind ever held in Europe, was opened on Thursday, June 15th in Bingley Hall, Birmingham, England, by the Lord Mayor of the city, and remained open until Saturday, June 24th. There were 85 exhibitors of foundry appliances and accessories. Approximately 1,000 tons of machinery was installed and 400 horsepower supplied for the working of the exhibits. Visitors from the States agreed that the exhibition surpassed the earlier American enterprises in that way. Co-operating in the organization were the Birmingham Chamber of Commerce, the Cast Iron Research Association, and the Institution of British Foundrymen, the last-named body holding its annual convention in Birmingham in the second week of the exhibition. A part of the hall was laid out as a modern foundry with cupola and other melting appliances, molding machines and other accessories. On the black-sanded floor were conducted a series of molding and core-making competitions for which entries were made to the number of 377, the competitors coming from all parts of Great Britain. A pattern-making competition organized in advance provided a fine display in the annex.

America was represented among the exhibitors by the Osborn Manufacturing Company, Cleveland, Ohio, who showed heavy duty roll-over jolt molding machines and other molding and foundry appliances; and Mr. David McLain of Milwaukee, who had examples of the uses of semi-steel and particulars of his system of instruction for foundrymen. The Belgian exhibitors were Ateliers' Ivan Lamoreux, S. A., of Liege, showing ladles, sand grinders, etc. The famous Paris firm of Bonvillain and Ronceray was represented by their associated London firm, the Universal System of Machine Moulding Company, Mons. Ronceray being in attendance. The most striking novelties were the Ronceray hydraulic jolting machine, and a new agglutinator which enables an oil-sand core to dry in the air and dispenses with stoving.

British exhibitors provided a comprehensive display illustrating practically every detail of modern developments in melting equipment, machines and molding machinery operated by pneumatic, hydraulic and electric power. Sand grinding and mixing machines also were shown in operation. Jolt-ramming machines were very much in evidence. The exhibition appeared to have been arranged mainly in the interest of iron and steel founding, but many of the exhibits were such as bore directly or indirectly on the non-ferrous industries. The Morgan Crucible Company of London, for instance, showed Morgan's and Salamander crucibles specially adapted for non-ferrous metal melting, Salamander retorts for the distillation and purification of zinc and special electric furnaces and most of the melting, molding and accessory plants on exhibition were applicable to non-ferrous work.—H.

TRADE PUBLICATIONS

Ledrite Brass Rod.—A sheet issued by the Bridgeport Brass Company, Bridgeport, Conn., telling some of the advantages of their Ledrite Brass Rod.

Elalco.—Catalog No. 7 issued by the Electrical Alloy Company, Morristown, N. J., covering Elalco Monel Metal and the various parts made of this metal from above.

Casements and Double Hung Windows.—A very elaborate and interesting catalog showing all sorts of casements made by David Lupton's Sons Company, Philadelphia, Pa.

Year Book of the American Bureau of Metal Statistics. A summary of the production, imports, exports, foreign situation and prices of lead, copper, zinc, gold and silver.

The **Service of Arthur D. Little, Inc.,** a folder from Arthur D. Little, Inc., Cambridge, Mass., telling of various departments and showing the growth of their organization.

Some Aspects of the Labor Problem.—An address by J. G. Walber, Executive-Secretary, Bureau of Information, for the Eastern Railroads, delivered at the monthly meeting of the Traffic Club of New York, May 26th, 1922.

250 Lacquer Questions Answered.—A booklet issued by the Zeller Lacquer Mfg. Co., Inc., 342 Madison avenue, N. Y., listing 250 questions on lacquers, their constituents, their uses, etc., and answers. A very useful booklet to have.

Automatic Sand Blast Machines.—A catalog describing and illustrating Sand Blast Machines made by the Hoevel Mfg. Corporation, Jersey City, N. Y. The catalog is complete and fully illustrated throughout, giving the reader a wide selection.

Mellon Institute of Industrial Researech.—The ninth annual report of this Industrial Research Institute which explains the growth of the industrial fellowship system, some improvements of the system, the publication of researches and a list of industrial fellowships.

Thwing Radiation Pyrometers.—Bulletin 11 issued by the Thwing Instrument Company, Philadelphia, Pa., which describes their complete line of indicating and recording radiation pyrometer. It is stated that Dr. Thwing was a pioneer in developing this line of pyrometry along practical lines.

Photogravure of a Spectrogram.—A booklet issued by Adam Hilger, Ltd., 75a Camden Road, London, N. W. 1, England, illustrating spectrograms of lead and copper, made with the Hilger Quartz Spectrograph E 3; and accompanied by circular matter describing the application of this instrument to metallurgical work.

National Foreign Trade Council.—A report giving the "Final Declaration" of the Ninth National Foreign Trade Convention, presented by the General Convention dated May 12th, 1922. This declaration urges expansion of foreign trade, purchase of foreign securities by American investors, creation of debenture-issuing corporations under the Edge Act and a number of other items.

Lupton Service Products.—Catalog No. 11 issued by David Lupton's Sons Company. A large and attractive catalog covering all the products made by this concern which specializes in steel sash and related products. It is stated that an entirely new phase of the steel sash industry, which is original with the Lupton Company, is the exposition of steel windows for apartments and residences.

Quick Break Lever Switches.—Bulletin No. 47326, issued by the General Electric Company, Schenectady, N. Y., on its Type QC-3 Quick Break Lever Switches up to 600 volts and 1,000 amperes. At normal rating it is said, that no part of these switches will exceed the heating limits specified by the A. I. E. E. providing the switches are kept in proper adjustment. They will also stand the insulation test of that institute.

Regulating Boiler Feed Water.—A booklet published by the Northern Equipment Company, Erie, Pa., covering the subject of boiler feed water regulation. To make the material more concise, a graphical method of presentation has been used. The booklet includes charts showing the effect of feed water regulation on water input, steam output, feed water temperature, etc., also other charts, photographs, etc.

The **Surface Combustion Company,** industrial furnace engineers and manufacturers, of 366 Gerard Avenue, Bronx, New York, are issuing a series of bulletins pertaining to industrial furnaces. Bulletin No. 3-D is devoted to Surface Combustion Low-Pressure Air-Gas Inspirators, which are readily applicable to any make of gas furnace. Bulletin No. 5 is entitled "Surface Combustion Oven Furnaces," and describes furnaces for the heat treatment of both carbon and high speed steel, etc. Bulletin No. 6 is devoted to Surface Combustion Pot-Hardening Furnaces. Bulletin No. 7 is entitled "Surface Combustion Soft Metal Furnaces." Bulletin No. 8 is devoted to Surface Combustion Galvanizing Baths. Bulletin No. 16 is entitled "Surface Combustion Shipyard Furnaces." Bulletin No. 17 is about Surface Combustion Rivet Heaters. Bulletin No. 18 is entitled "Surface Combustion Small Forges." Bulletin No. 24 is entitled "Surface Combustion Laboratory Furnaces for High Temperatures."

American Travel and Hotel Directory.—Published by American Travel and Hotel Directory Co., N. Y. Size 5¾ x 9¼, over 2,000 pages. Price $10.00 payable in advance. For sale by THE METAL INDUSTRY. This is a very useful book for organizations which have men on the road or for anyone who finds it necessary to use hotels extensively. All the important hotels in the country are listed and rated as to quality of service; construction, that is, fire proof or not; type of hotels, such as, summer, year round, etc.; American plan and so on. In other words, complete information is given about all the important hotels to the traveler so that he may know in what sort of a place he will stay. In addition the cities are described on such points as altitude, population, location, transportation facilities, industries, etc., which include hotel syndicate and trade personnel, hotel associations, clubs, restaurants available and reports on railroads, and steamship lines, form other parts of this book. It is a remarkably big job to get together such a directory but the publishers seem to have done it with complete success. It is indispensable to those in whose business traveling plays a large part.

Review of the Wrought Metal Business

WRITTEN FOR THE METAL INDUSTRY BY J. J. WHITEHEAD, WHITEHEAD METAL PRODUCTS COMPANY, NEW YORK.

There have been so many factors which have contributed to swell the volume of business in non ferrous metals, that in spite of the fact that the mills are running full, production has not kept up with demand. It is impossible to secure anything like prompt deliveries from any of the mills.

The automobile business continues extremely heavy, and all indications point to the fact, that the month of June will see the highest record figure, in the production of motor cars in this country. The significance of this in the consumption of brass and copper material can be readily seen as in this field alone there are consumed many millions of pounds of these metals.

There seems to be no question in the minds of many in the trade, that any curtailment of production in the manufacturing of automobiles will cut quite a figure in the tonnage of the mills fabricating material for the automobile industry. It is said in some quarters to be inevitable that in the face of the tremendous number of automobiles which have been absorbed by the public in the past three months, that there must be some seasonal decline very shortly. Reports are that in some parts of the country retail sales conditions indicate already a small curtailment in the buying of motor cars, but it is not anticipated that this will reach the proportions of a very serious slump.

Other industries have been coming to the front in the purchasing of copper fabricated material. Particularly is this true of the public service and utility corporations. There have been many large orders placed for copper wire, bus-bar and other articles for electrical power-house and transmission work, and the tonnage from this source has been very large.

There was a time a few years ago when the demand for copper for washing machines was so great that it represented about 75% of all the sheet copper orders on the books of the various rolling mills. The industry, however, went through a very serious slump, and the demand from this source became almost negligible. In recent months, however, it has revived, and the various washing machine people are again calling upon the mills for fairly respectable quantities of sheet copper.

The business in seamless brass and copper tubes has been revived and most of the mills are from six to ten weeks behind on orders in this department. One mill in particular, making a specialty of condenser tubes reports that on

admiralty mixture tubes they are quoting from eight to twelve weeks delivery.

There have been some very interesting orders for sheet copper and brass pipe placed for use in the building trades. The revival in the building trades all over the country has been a very important factor in this line. An examination of building statistics published from time to time develops the fact that for the first five months of this year the volume of building has amounted to $1,352,965,000, representing the highest recorded figures for the first five months in any year.

During all of this extreme activity in the building trade, there has been an effort on the part of the producers of brass and copper materials to impress upon the public the extreme desirability of using brass and copper materials wherever possible in building construction. The Copper and Brass Research Association have carried on a very active campaign, and the individual mills have supplemented this campaign with advertising of their own. The result has been noticeable in a wide-spread interest by the public, in behalf of brass pipe, sheet copper and other materials, made from copper and brass. There is still much work to be done in this direction, however, as it has not been possible to eradicate entirely from the mind of the average layman, the feeling which he has had that brass and copper is entirely out of reach of the ordinary or home builder. One of the chief obstacles which is still to be overcome is the tendency on the part of the smaller plumbers, tinsmiths and roofers to add abnormal profits to any job on which brass and copper is desired. When this difficulty has been surmounted, and the co-operation of all the trade has been secured, there will be a further widening of the demand for these articles.

Another branch of the non ferrous metal business which has become extremely active, is that which includes the various nickel and copper alloys. Practically all of the manufacturers of nickel silver are running full and there seems to be a very large market for this material. There is a very active business in the various resistance wires and alloys in which nickel is the principal element. In this field also, the automobile industry has been an important factor, because of the demand for these metals for use in the lighting systems and spark plugs. In addition to these factors, however, the requirements for many articles now produced in the electrical field for household use, has been responsible for a large proportion of the orders placed with the mills in this line.

It is expected, that during the month of July, the new mill of the International Nickel Company at Huntington, W. Va., will be put into operation for the production of Monel Metal in sheets and rods. There has been in the past a great deal of difficulty in securing an adequate supply of Monel Metal, in fabricated forms and many industries which would have used this product in the past have been unable to do so because it has been impossible to be sure of a steady supply. When this difficulty has been overcome, it is anticipated that many new developments will open up for the use of Monel Metal.

There is a very wide field for Monel Metal in the textile industry, and it is expected that this alone will consume a very large portion of the product of the Huntington mill. There has already been a large demand from the textile trade, particularly in the dyeing and bleaching departments.

The general use of a rust-proof, alkali-and-acid-proof metal will save millions of dollars a year to the textile industry in this country, in preventing damaged goods alone. This does not take into account the great cost of frequent renewal of metal equipment, such as has heretofore been used. The life of other metals when used in textile processes has been very brief. The development of the production of Monel Metal is of equal importance in other industries where there is a very serious need for a metal which will resist corrosion. It is felt, therefore, that to the non-ferrous trade any development of this kind which makes for progress in the industry is of interest to all, and adds to the growth of the industry.

Reviewing the situation as a whole, it can be said that the trade in copper nickel and these alloys is in a much healthier and more prosperous condition than has been the case for a great many months.

Metal Market Review

Written for The Metal Industry by METAL MAN

COPPER

Market operations in copper during the past month were on a decidedly substantial scale, although the degree of activity and interest hardly equalled that in May. Sales in June to domestic and export buyers are estimated at 125,000,000 to 140,000,000 pounds. Electrolytic fluctuated between 13⅝c@14c, but a large tonnage was sold at 13¾c@13⅞c.

The refined surplus is down to nearly normal, not including some 160,000,000 pounds, or more, held by the Export Association. Production must now be relied upon to provide the supplies needed for the domestic trade. The general market is firmer than it was a short time ago, with quotations on the electrolytic basis of 13⅞c@14c per pound.

ZINC

The zinc market is distinctly firm owing to considerable new business and the determination of producers not to press sales below current price levels. The scattering outside lots which were hanging over the market recently have been sold. This has strengthened the tone and given more confidence to both sellers and buyers. Recent New York basis was 5.77½c@5.82½c and 5.42½c@5.47½c East St. Louis delivery. These prices compare with 5.60c@5.65c New York and 5.25c@5.30c East St. Louis on June 1. Consumption is on a large scale with a heavy tonnage going to the sheet mills every month. On going to press a more active inquiry has developed. The tendency of market is upward.

TIN

Trading activity in tin continues to be confined to narrow limits. Actual consumption at domestic mills is heavy, but new demand has been disappointing all through June. Recent deliveries to consuming interests, however, were large and further important shipments will take care of a good proportion of nearby requirements.

There has been an enormous increase in consumption this year which reflects the remarkable recovery in domestic demand. The heavy shipments this year have been well absorbed, and the last half of 1922 is expected to witness equally good deliveries.

Prices of Straits on July 5 were 31⅜c@31½c for all positions next two months. These quotations compared with 31¾c@31⅞c on June 1. London cables reflected firm feeling at that centre. Market here was also firm, but not particularly active as consumers appear well supplied. The afloat shipments from the Straits on July 5 amounted to 6,150 tons.

LEAD

Demand for pig lead is not so urgent as it was a few weeks ago, but prices are maintained on the basis of 5.75c@5.80c New York and 5.52½c@5.57½c shipment from East St. Louis. Consumption keeps up to a high level, but production is also able to meet demand. Present prices should cause output to increase steadily at all producing centres. White lead interests are very active and additional orders are looked for from this source. Buyers, however, are not so eager to excitedly follow a radical upward tendency. The position appears in fairly sound condition, but manufacturers are inclined to think twice before being carried off their feet by a display of rampant tactics tending to boost prices beyond a safe limit. With Missouri, Okalahoma and the Coeur d'Alene districts equipped to maintain heavy shipments supplies should be equal to all requirements.

ALUMINUM

Aluminum prices in both the primary and outside market remain practically unchanged from what they were 30 days ago. The Aluminum company quotes 99% metal at 20.10c, the 98-99% virgin quality 19.10c, and 94-98% grade 18.10c. Outside prices for 98-99% virgin metal are 17.75c@18.00c, with the 98-99% remelted article 16.75c@17.25c. The automobile industries are taking fair quantities from time to time. One prominent motor concern is understood to be using from

100,000 to 110,000 pounds of aluminum per month. Manufacturers of cooking utensils and other users of aluminum are opposed to any increase in the tariff on imported metal.

ANTIMONY

The situation in antimony has quieted down recently and the market is without any special activity. Spot and July regulars quote 4.95c@5.05c, but there is not enough buying lately to stimulate broad interest. Holders build hopes of a higher range of prices on a higher tariff, but aside from this prospect there is not much encouragement for buyers to anticipate forward requirements. Substantial shipments are due to arrive from the Orient in a few weeks. The indications are that there will be a considerable stock of the Chinese product by September and October.

QUICKSILVER

The wholesale quotations for 75 pound flasks are $55@57, with the London price on July 5th at £11 10s. 0d. Recent arrivals have been on a good scale. Prices here have been kept from advancing in sympathy with a decline of £1 at London.

PLATINUM

There is a little firmer tone to the platinum market. Quotations are now $87@$90 for the pure metal. Imports have fallen off recently, and although some platinum comes from Russia it is difficult to arrange for a regular supply from that country.

SILVER

Prices for foreign are a little firmer at 71¾c per ounce, with London 36⅜d as of date of July 5th. Domestic is 99⅝c. Demand is good, with a free market for all offerings.

OLD METALS

The scrap metal situation lacks the buoyancy and snap which was so conspicuous a feature a few weeks ago. Recent transactions were at concessions, but for some of the scraps fairly steady prices were maintained. Dealers, however, were chary in bidding full figures, and the buyer generally succeeding in striking a bargain when any attractive orders developed. There is considerable confidence displayed in the market for scrap material. Holders view the outlook hopefully and brisker conditions in the trade are anticipated within the next few weeks. July opens with the following quotations as what the dealers generally are prepared to pay: Crucible copper No. 1 grade, 11½c@11⅝c; light copper, 9⅛c@9¼c; light brass, 4⅞c@5c; heavy brass, 5½c@5¾c; aluminum clippings, 13½c@13¾c; heavy lead, 4.62½c@4.65c, and new zinc scrap, 3¾c@4c.

METAL STOCK MARKET QUOTATIONS

	Par	Bid	Asked
Aluminum Company of America.....	$100	$400	$450
American Hardware Corp.....	100	175	178
Bristol Brass	25	17	19
International Nickel, com.....	25	16¼	16½
International Nickel, pfd.....	100	...	...
International Silver, com.....	100	20	...
International Silver, pfd.....	100	99	101
New Jersey Zinc.....	100	140	143
Rome Brass & Copper.....	100	95	105
Scovill Mfg. Co.....	100	330	360
Yale & Towne Mfg. Co.....	...	300	310

Corrected by J. K. Rice, Jr., & Co., 36 Wall Street, New York.

WATERBURY AVERAGE

Lake Copper—Average for 1920, 13.136. January, 1922, 13.875—February, 13.375—March, 13.125—April, 13.00—May, 13.375—June, 14.00.

Brass Mill Zinc—Average for 1920, 5.175—January, 1922, 5.25—February, 5.00—March, 5.10—April, 5.40—May, 5.55—June, 5.85.

Daily Metal Prices for the Month of June and July 10, 1922

Date	1	2	5	6	7	8	9	12	13	14	15	16	19
Copper (f. o. b. N. Y.) c/lb.:													
Lake	14.25	14.25	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00
Electrolytic	13.875	13.875	13.875	13.875	13.875	13.875	13.875	13.875	13.75	13.75	13.625	13.625	13.625
Casting	13.375	13.375	13.375	13.375	13.375	13.375	13.375	13.375	13.375	13.375	13.375	13.375	13.375
Zinc (f. o. b. St. L.) c/lb.:													
Prime Western	5.30	5.30	5.35	5.35	5.40	5.40	5.40	5.45	5.45	5.40	5.40	5.40	5.40
Brass Special	5.375	5.40	5.50	5.50	5.50	5.50	5.55	5.55	5.55	5.55	5.50	5.50	5.50
Tin (f. o. b. N. Y.) c/lb.:													
Straits	31.875	32.125	32.25	32.625	32.50	32.125	32.00	31.625	31.125	31.25	31.50	31.75	31.125
Pig—99%	30.875	31.25	31.50	31.75	31.50	31.125	31.125	30.75	30.375	30.50	30.875	31.00	30.625
Lead (f. o. b. St. L.) c/lb	5.50	5.50	5.60	5.60	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.65	5.625
Aluminum, c/lb.	18	18	18	18	18	18	18	18	18	18	18	18	18
	20.10	20.10	20.10	20.10	20.10	20.10	20.10	20.10	20.10	20.10	20.10	20.10	20.10
Nickel c/lb.:													
Ingot	29-36	29-36	29-36	29-36	29-36	29-36	29-36	29-36	29-36	29-36	29-36	29-36	29-36
Electrolytic (Internat. Nick. Co.)	39	39	39	39	39	39	39	39	39	39	39	39	39
Electrolytic, outside spot	31	31	31	31	31	31	31	31	31	31	31	31	31
Antimony (Jap. and Chin.) c/lb..	5.40	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.125	5.125	5.125	5.125	5.10
Silver (foreign) c/oz	71.75	71.75	71.375	70.875	71.375	72.25	71.875	71.50	72.25	72.125	71.875	71.375	70.875
Platinum $/oz	85	85	85	85	85	85	85	85	85	85	85	85	85

Date	20	21	22	23	26	27	28	29	30	High	Low	Aver.	July 10
Copper (f. o. b. N. Y.) c/lb.:													
Lake	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.00	14.25	14.00	14.023	14.00
Electrolytic	13.625	13.625	13.50	13.625	13.625	13.625	13.625	13.625	13.75	13.875	13.50	13.727	14.00
Casting	13.375	13.375	13.25	13.25	13.25	13.25	13.25	13.25	13.25	13.375	13.25	13.335	13.35
Zinc (f. o. b. St. L.) c/lb.:													
Prime Western	5.35	5.35	5.35	5.35	5.325	5.30	5.30	5.35	5.35	5.45	5.30	5.347	5.50
Brass Special	5.45	5.45	5.45	5.45	5.45	5.40	5.40	5.45	5.45	5.55	5.375	5.438	5.60
Tin (f. o. b. N. Y.) c/lb.:													
Straits	31.375	31.25	31.25	31.25	31.125	31.00	30.875	30.75	31.00	32.625	30.875	31.534	31.50
Pig—99%	30.875	30.625	30.50	30.375	30.375	30.375	30.25	30.00	30.25	31.75	30.25	30.766	30.75
Lead (f. o. b. St. L.) c/lb	5.625	5.625	5.60	5.55	5.55	5.55	5.55	5.55	5.55	5.65	5.50	5.604	5.50
Aluminum c/lb.	18	18	18	18	18	18	18	18	18	18	18	18	18
	20.10	20.10	20.10	20.10	20.10	20.10	20.10	20.10	20.10	20.10	20.10	20.10	20.10
Nickel c/lb.:													
Ingot	29-36	29-36	29-36	32-36	32-36	32-36	32-36	32-36	32-36	36	29	29.8-36	32-36
Electrolytic (Internat. Nick. Co.)	39	39	39	39	39	39	39	39	39	39	39	39	39
Electrolytic, outside spot	31	31	31	32-34	32-34	32-34	32-34	32-34	32-34	34	31	31.56	32-34
Antimony (Jap. and Chin.) c/lb..	5.05	5.05	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.40	5.00	5.13	5.00
Silver (foreign) c/oz	70.625	70.625	70.375	70.25	70	70.75	70.75	70.50	70.75	72.25	70	71.171	70.75
Platinum $/oz.	85	85	85	85	85	85	87.90	87.90	87.90	90	85	85.48	87.90

Metal Prices, July 10, 1922

INGOT METALS AND ALLOYS

Brass Ingot, Yellow	"	"	"	9 to11
Brass Ingots, Red	"	"	"	11¾to13¾
Bronze Ingot	"	"	"	12 to13½
Casting Auminum Alloys	"	"	"	18 to21
Manganese Bronze Castings	"	"	"	21 to33
Manganese Bronze Ingots	"	"	"	12 to15½
Manganese Bronze Forgings	"	"	"	30 to40
Manganese Copper, 30%	"	"	"	50 to56
Monel Metal	"	"	"	38
Parsons Manganese Bronze Ingots	"	"	"	16½to18
Phosphor Bronze	"	"	"	24 to30
Phosphor Copper, guaranteed 15%	"	"	"	17 to26
Phosphor Copper, guaranteed 10%	"	"	"	16½to25½
Phosphor Tin, guarantee 5%	"	"	"	35⅝to45⅝
Phosphor Tin, no guarantee	"	"	"	40 to50
Silicon Copper, 10%	according to quantity			34 to38
Bismuth—Duty free				2.00-2.10
Cadmium—Duty free				1.15-1.25
Chromium Metal—95-98% Cr., per lb. Cr. contained				1.50
Cobalt—97% pure				3.00-3.25
Manganese Metal—95-98% Mn., carbon free, per lb.				0.75
Magnesium Metal—Duty 20% ad valorem				$1.25-1.35
Open seam tubing	0.23⅝			0.28⅝
Quicksilver—Duty 10% per flask of 75 lbs.				$55-$56

OLD METALS

Buying Prices		Selling Prices
11¼to11¾	Heavy Cut Copper	12½to12¾
11 to11½	Copper Wire	12¼to12½
10 to10¼	Light Copper	11 to11¼
8½to 9	Heavy Machine Comp	10 to10½
6¾to 7	Heavy Brass	8 to 8½
5½to 6	Light Brass	7 to 7¼
6¼to 6½	No. 1 Yellow Brass Turnings	7¼to 7½
7¾to 8½	No. 1 Comp. Turnings	9¼to10
4	Heavy Lead	4½
4	Zinc Scrap	4½
6 to 6½	Scrap Aluminum, Turnings	8 to 9
11½to12½	Scrap Aluminum, cast alloyed	13½to14½
14½to15½	Scrap Aluminum, sheet (new)	16½to17½
18½	No. 1 Pewter	22½
15	Old Nickel anodes	17
23 to25	Old Nickel	27 to29

BRASS MATERIAL—MILL SHIPMENTS

In effect June 1, 1922.

To customers who buy 5,000 lbs. or more in one order.

	Net base per lb.		
	High Brass.	Low Brass.	Bronze.
Sheet	$0.16¾	$0.18⅜	$0.19⅞
Wire	0.17¼	0.18⅞	0.20⅜
Rod	0.14¾	0.19⅜	0.20⅞
Brazed tubing	0.23⅝	.....	0.28⅝
Open seam tubing	0.23⅝	.....	0.28⅝
Angles and channels	0.26⅝	.....	0.31⅝

To customers who buy less than 5,000 lbs. in one order.

	Net base per lb.		
	High Brass.	Low Brass.	Bronze.
Sheet	$0.17¾	$0.19⅜	$0.20⅞
Wire	0.18¼	0.19⅞	0.21⅜
Rod	0.15¾	0.20⅜	0.21⅞
Brazed tubing	0.24⅝	.....	0.29⅝
Open seam tubing	0.24⅝	.....	0.29⅝
Angles and channels	0.27⅝	.....	0.32⅝

SEAMLESS TUBING

Brass, 20½c. to 21½c. per lb. base.

Copper, 23¼c. to 24¼c. per lb. base.

TOBIN BRONZE AND MUNTZ METAL

Tobin, Bronze Rod	18¾c. net base
Muntz or Yellow Metal Sheathing (14"x48")	16¾c. " "
Muntz or Yellow Rectangular Sheets other than Sheathing	17¾c. " "
Muntz or Yellow Metal Rod	14¾c. " "

Above are for 100 lbs. or more in one order.

COPPER SHEET

Mill shipments (hot rolled)	19¾c.-21¼c. net base
From stock	20¾c.-22¼c. net base

BARE COPPER WIRE—CARLOAD LOTS

15¾c. to 16c. per lb. base.

SOLDERING COPPERS

300 lbs. and over in one order	18¾c. per lb. base
100 lbs. to 200 lbs. in one order	19¼c. per lb. base

ZINC SHEET

Duty, sheet, 15%. Cents per lb.

Carload lots, standard sizes and gauges, at mill, 7½c. basis less 8 per cent. discount.

Casks, jobbers' prices	8½c. to 9c.
Open casks, jobbers' prices	9½c. to 10c.

ALUMINUM SHEET AND COIL

Aluminum sheet, 18 ga. and heavier, base price	32c.
Aluminum coils, 24 ga. and heavier, base price	30c.

NICKEL SILVER (NICKELENE)

Base Prices

Grade "A" Nickel Silver Sheet Metal

10% Quality	24½c.	per lb.
15% "	26¼c.	" "
18% "	27 c.	" "

Nickel Silver Wire and Rod

10% "	27½c.	" "
15% "	31½c.	" "
18% "	34¼c.	" "

MONEL METAL

Shot	32
Blocks	32
Sheet Bars	40
Hot Rolled Rods (base)	40
Cold Drawn Rods (base)	50
Hot Rolled Sheets (base)	45

BLOCK TIN SHEET AND BRITANNIA METAL

Block Tin Sheet—18" wide or less. No. 26 B. & S. Gauge or thicker, 100 lbs. or more, 10c. over Pig Tin. 40 to 100 lbs., 15c. over 25 to 50 lbs., 17c. over, less than 35 lbs., 25c. over.

No. 1 Britannia—18" wide or less. No. 26 B. & S. Gauge or thicker, 500 lbs. or over, 8c. over N. Y. tin price; 100 lbs. or more, 10c. over Pig Tin. 50 to 100 lbs., 15c. over, 25 to 50 lbs., 20c. over, less than 25 lbs., 25c. over. Above prices f. o. b. mill.

SILVER SHEET

Rolled silver anodes .999 fine are quoted at from 74c. to 76c. per Troy ounce, depending upon quantity.

Rolled sterling silver 72c. to 74c.

NICKEL ANODES

85 to 87% purity	42½c. per lb.
90 to 92% purity	45c. per lb.
95 to 97% purity	47½c. per lb.

Supply Prices, July 10, 1922

CHEMICALS

In Commercial Quantities—New York Prices

Acetone	lb.	.10½–.13
Acid—		
Boric (Boracic) Crystals	lb.	.14
Hydrochloric (Muriatic) Tech., 20 deg., Carboys	lb.	.02½
Hydrochloric, C. P., 20 deg., Carboys	lb.	.08
Hydrofluoric, 30%, bbls.	lb.	.07
Nitric, 36 deg. Carboys	lb.	.07
Nitric, 42 deg. Carboys	lb.	.07¼
Sulphuric, 66 deg. Carboys	lb.	.02½
Alcohol—		
Butyl	lb.	20-25c.
Denatured in bbls.	gal.	.32
Alum—		
Lump, Barrels	lb.	.04
Powdered, Barrels	lb.	.05
Aluminum sulphate, commercial tech	lb.	.02½–.03
Aluminum chloride solution	lb.	.20
Ammonium—		
Sulphate, tech., Barrels	lb.	.04
Sulphocyanide	lb.	.50
Argols, white, see Cream of Tartar	lb.	.27
Arsenic, white, Kegs	lb.	.08
Asphaltum	lb.	.35
Benzol, pure	gal.	.45
Blue Vitriol, see Copper Sulphate.		
Borax Crystals (Sodium Biborate), Barrels	lb.	.05½
Calcium Carbonate (Precipitated Chalk)	lb.	.05
Carbon Bisulphide, Drums	lb.	.07½
Chrome Green	lb.	.36
Cobalt Chloride	lb.	—
Copper—		
Acetate	lb.	.36
Carbonate, Barrels	lb.	.19
Cyanide	lb.	.58
Sulphate, Barrels	lb.	.06½
Copperas (Iron Sulphate, bbl.)	lb.	.02½
Corrosive Sublimate, see Mercury Bichloride.		
Cream of Tartar, Crystals (Potassium bitartrate)	lb.	.27
Crocus	lb.	.15
Dextrin	lb.	.05-.08
Emery Flour	lb.	.06
Flint, powdered	ton	$30.00
Fluor-spar (Calcic fluoride)	ton	$75.00
Fusel Oil	gal.	3.00
Gold Chloride	oz.	14.00
Gum—		
Sandarac	lb.	.33
Shellac	lb.	—
Iron, Sulphate, see Copperas, bbl	lb.	.02½
Lead Acetate (Sugar of Lead)	lb.	.12-.13
Yellow Oxide (Litharge)	lb.	.09
Mercury Bichloride (Corrosive Sublimate)	lb.	.92
Nickel—		
Carbonate Dry	lb.	.40
Chloride, 100 lb. lots	lb.	.27½–.40
Salts, single bbls.	lb.	.11
Salts, double, bbl.	lb.	.11
Paraffin	lb.	.07-.10
Phosphorus—Duty free, according to quantity		.25–.30
Potash, Caustic, Electrolytic 88-92% fused, drums	lb.	6½
Potassium Bichromate, casks	lb.	.10¼
Carbonate, 80-85%, casks	lb.	.05
Cyanide, 165 lb. cases, 94-96%	lb.	.50
Pumice, ground, bbls.	lb.	.03
Quartz, powdered	ton	$30.00
Official	oz.	—
Rosin, bbls.	lb.	.03½
Rouge, nickel, 100 lb. lots	lb.	.20
Silver and Gold	lb.	.60
Sal Ammoniac (Ammonium Chloride) in casks	lb.	.07½
Silver Chloride, dry	oz.	.86
Cyanide	oz.	—
Nitrate, 100 ounce lots	oz.	.47
Soda Ash, 58%, bbls.	lb.	.03
Sodium—		
Biborate, see Borax (Powdered), bbls.	lb.	.05½
Bisulphate, tech., bbls.	lb.	.03½
Cyanide, 96 to 98%, 100 lbs.	lb.	.25
Hydrate (Caustic Soda) bbls.	lb.	.04½
Hyposulphite, kegs	lb.	.04
Nitrate, tech. bbls.	lb.	.04
Phosphate, tech., bbls.	lb.	.03¼
Silicate (Water Glass) bbls.	lb.	2½
Sulpho Cyanide	lb.	.45
Soot, Calcined	lb.	—
Sugar of Lead, see Lead Acetate	lb.	.12–.13
Sulphur (Brimstone) bbls.	lb.	.01¾
Tin Chloride, 100 lb. kegs	lb.	.29½
Tripoli	lb.	.03½
Verdigris, see Copper Acetate	lb.	.36
Water Glass, see Sodium Silicate, bbls.	lb.	.02½
Wax—		
Bees, white ref. bleached	lb.	.50
Yellow, No. 1	lb.	.24
Whiting, Bolted	lb.	.02½–.06
Zinc, Carbonate, bbls.	lb.	.13–.17
Chloride, 600 lb. lots	lb.	.06½
Cyanide	lb.	.41–.42
Sulphate, bbls.	lb.	.03½

COTTON BUFFS

Open buffs, per 100 sections (nominal).		
12 inch, 20 ply, 64/68, cloth	base,	36.60
14 inch, 20 ply, 64/68, cloth	base,	45.55
12 inch, 20 ply, 84/92, cloth	base,	42.55
14 inch, 20 ply, 84/92, cloth	base,	57.35
12 inch, 20 ply, 88/96, cloth	base,	46.20
14 inch, 20 ply, 88/96, cloth	base,	62.25
Sewed Buffs, per lb., bleached and unbleached	base,	.50

FELT WHEELS

			Price Per Lb. Less Than 100 Lbs.	100 to 300 Lbs.	300 Lbs. and Over
Diameter—10" to 16"		1" to 3"	2.60	2.50	2.35
"	6", 8" and over 16"	1" to 3"	2.70	2.60	2.45
"	6" to 24"	Over 3"	3.00	2.90	2.75
"	6" to 24"	½" to 1"	3.60	3.50	3.35
"	4" to 6"	¼" to 3"	4.60	} Any quantity	
"	Under 4"	¼" to 3"	5.20		

Grey Mexican or French Grey—10c. less per lb. than Spanish, above. Odd sizes, 50c. advance.